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Oldman River land use study

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BOOK ONE

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FOREWORD

This study is being conducted at the request of Mr. John Markovich, Supervisor of Special Land Use - Lands Division of the Department of Lands and Forests. The objectives of this study, which is located along the Oldman River in the vicinity of Lethbridge and district, are:

(1) To determine the various past and present uses of the river and adjacent area and to record them.

(2) To determine the effect of these uses on the river and surrounding area, if possible with existing information.

(3) To recommend suitable future uses which should be permitted.

The purpose of this study is to get better co-ordination of land uses which are compatible. There has been lack of co-ordination of use and almost total disregard of past and existing uses and their effect on other uses to date, in this area. To avoid this from reoccurring, I am involving the following disciplines in this study to ensure their views are being considered:

(1) Mr. R.J. Knight, District Engineer, B.R.D.

(2) Mr. S. Ho, Planner for the Oldman River Regional Planning Commission

(3) Mr. Gordon Haugen, Regional Fisheries Biologist

(4) Mr. Morley Barrett, Regional Wildlife Biologist

(5) Mr. E.A. Lawrence, City of Lethbridge Engineer

(6) Mr. Neil J. Andrew, River Valley Recreation Development of City Parks and Recreation

(7) Sand and Gravel Operators (a) Lethbridge Concrete Products
(b) New Lethbridge Sand & Gravel

(8) County of Lethbridge

ACKNOWLEDGEMENTS

This study was conducted in order to co-ordinate efforts and to attain optimum use of the lands for the foreseeable future. This study would not have been possible without the very much appreciated co-operation of the individuals and governing bodies on the previous page.

Information from the following is also very much appreciated by the writer:

(1) Technical Division, Department of Lands and Forests
(2) Mr. ~~Ed~~ Idwal Potter, Mines Inspector - Department of Mines and Minerals
(3) Mr. O. Swensen, Aggregates Engineer - Department of Highways
(4) Special Land Use Section, Department of Lands and Forests

INFORMATION FROM LITERATURE

Below are some facts which are pertinent to this study. These excerpts are from books about geomorphology and geology.

(1) About Water and Sediments in Channels:

"Rivers drain water from the continents to the ocean and are the principal routes for transporting the products of weathering. Gravity provides the force by which both excess water and movable debris are brought from higher to lower elevations."

(2) Discharge (c.f.s.) = channel width (ft) x channel depth (ft) x velocity

c.f.s. = cubic feet per second

ft. = feet

(3) A stream's velocity usually increases toward its mouth even though the gradient decreases.

(4) The mean annual flow is not responsible for the observed conditions but simply reflects changes by more effective flows.

(5) Gravel moves during flows but the zones of accumulation change little.

(6) Gravel bars are more or less spaced 5 to 7 channel widths apart.

(7) Any obstruction of a stream will lessen its capacity or competance and will promote deposition.

The above are some rather factual statements which I have taken out of Leopolds book F Eluvial Processes in Geomorphology plus out of Physical Geology by Leet and Judson.

The hydraulic mechanics of streams and stream behavior are extremely complex and the amount of research work done in this field is very limited. Therefore, it follows that the amount known is relatively limited. Much work has been completed on stream banks and the upland part of our land area. The upland area is complex but is many times simpler and there is a multitude of information on upland land use and its effects.

As rivers are the principal routes for transporting products of weathering they deserve a great deal of observation and study. Rivers are one of the main sources of land form change.

Terrific forces are at work in rivers which can be used effectively by man with proper consideration of the facts. The large floods or heaviest flows of a stream channel are responsible for the present condition. The mean annual flow has little effect. According to the water resources people at Lethbridge, the whole streambed down to bedrock moves at peak annual flows in the Oldman River.

One should bear in mind that the mechanical hydraulic forces in a river are tremendous. Gravel is the product of weathering and is deposited and transported at high flows.

The amount of gravel removed as compared to what is present in a stream is infintesimal. Gravel is replaced and redeposited in the same accumulation zones which do not change much.

One of the major reasons this study was undertaken is to establish reasonably compatible land use and methods to accomplish this.

The sand and gravel industry is faced with increasing demands

for their products, rising property values, competition for use of land in urban areas, a desire for fair economic return on investments and increasing opposition by the public against the nature, the results and therefore, the extension of their operation. A sand and gravel operation is an industrial process utilizing heavy earth moving and processing equipment and large areas for stockpiles and machinery. A drastically altered landscape, noise and heavy traffic volumes are inherent operational characteristics. These factors produce a land use that is generally incompatible with many urban and some rural land uses. The persistent creation of derelict lands as a product of their operation and the predominantly disarrayed appearance of land aids, abets, and emphasizes the incompatibility factor, and has nurtured the industries public image to its present status.

Sand and gravel are components in the foundations of our homes and make up a major portion of the roads we travel.These elements are essential in the construction of almost all forms of manmade structures. There can be little doubt that sand and gravel are vital to the growth of our nation.

Sand and gravel removal is a mining operation and should be considered as such. The product is a bulky low-cost material in which its distance to market (hauling distance) plays a significant part in determining an economically accessible deposit. The cost of the material is often made up predominantly of a hauling cost with only a relatively small charge for the material itself. As of necessity most sand and gravel operations are located in or near to highly populated areas.

To date almost no apparent concern by the operators and little concern by the government is resulting in a poor public image for sand and gravel operations. Lack of legislation with "teeth" to enforce proper operation and rather lax issuance of sand and gravel leases on main watercourses and other upland areas has resulted in some problems and will result in a multitude more.

Things Which Could be Done to Improve the Situation

1. Before a lease is issued it should be ensured that removal of the material will not effect the surrounding inhabitants and land too adversely.

2. A proper well thought out method of operation and detailed operation plan should be submitted by the operator.

3. Conservationists should realize that it is necessary to remove sand and gravel and select areas which would be least damaging from their point of view. To date an almost universally negative voice has been heard - thus they were ignored which, I feel, is justified due to their rather poor and completely impractical attitudes.

4. As the governments at various levels are the largest users of gravel they should operate properly to set an example for other users. Lack of restoration and consideration of surrounding land uses has often resulted in unfavorable opinions being formed.

5. A publication providing sand and gravel operators basic information about how to operate and leave the site in a suitable condition after operation. would be of benefit.

DESCRIPTION OF STUDY AREA

For the location of the study area, I refer you to page 2 of Book Two of this study. These two books are designed to be used together to keep the written report as short as possible. I have indicated a primary study area from which most of the information was gathered. This primary area receives a higher degree digne of land use. The secondary study area is important but there is not near the disturbance of the stream in this area. The study begins at the confluence of the Oldman and St. Mary Rivers and extends almost to the confluence of the Oldman and Little Bow Rivers.

Geology and Soils of Area. The geology of the river and banks of the Oldman River are described as Alluvium (modern stream deposits: gravel, sand, silt, minor till and bedrock exposures). The upland deposits adjoining the banks are lacusterine and lacustro-till combinations. (Lacusterine - lake deposits predominantly of silt texture with minor clay which is locally varved). There is some moraine deposits but these are predominantly overlain by lacusterine deposits.

The upland soil is predominantly a silt loam in texture with some fine sandy loam and some clay loam. The topography of the land is generally level to gently undulating. The soil lies in the dark brown soil zone and is good quality agricultural land. The soil is relatively stone free. The profile is predominantly normal with some solonetz spots evident. The soil on the banks is exceedinly thin with little to no Ah horizon and thus is an immature profile. Some of the floodplains adjoining the stream are quite solonetz if they are not sandy and gravelly in texture.

Vegetation. The river flats or floodplains adjoining the stream itself when above the normal high water line have the following vegetative cover: medium density, Balsam Poplar and the understory vegetation consists predominantly of Melilotus spp. (sweet clover), Bromus spp. (brome grass), plus some Poa spp. (blue grass). Where there is no tree cover on the banks the cover usually consists of Stipa comata (needle and thread), Bouteloua gracilis (blue grama grass), plus some Koeleria cristata (June grass). The cover on the banks is very sparse.

The upland away from the banks is almost all cultivated land - much of which is irrigated.

Gradient of River. From the south boundary of SW 11-8-22-W4 to the north boundary of NW 9-10-21-W4, there is 22 miles of river and a one hundred foot drop in elevation. The gradient works out to 4.82 feet per mile.

River Bank Entrenchment. The banks are entrenched below the normal land from 250 to 350 feet averaging about 300 feet.

Climate of Area. Average annual precipitation = 16 inches

Average May to September precipitation = 9.75 inches

Potential Evapotranspiration = 23 inches

Mean Frost Free Period = 110 days

Elevation = 3,000 feet above sea level

RIVER FLOW DATA

Note on the next couple of pages the flow data which is gauged on NW 1-9-22-W4 in the city of Lethbridge.

There are no records from 1951 - 52 to 1956 - 57.

Note also a copy of a submission by the Oldman River Regional Planning Commission about minimum water flows. This would mean a minimum flow of 500 c.f.s. at the gauging station above.

River Flow Data 1911 to 1964 Oldman River Near Lethbridge
Station No. 5AD - 7

Location. Lat. 49° 42' 30", long. 112° 52' 30", Alberta, in NW 1/4 sec. 1, tp. 9, rge. 22, W4th mer. about 8 miles downstream from confluence with St. Mary River. Drainage Area: 6,630 square miles. Gauge: Recording, installed in November 1963 onw-quarter mile downstream from former manual gauge location. Period of Record: September 1911 to September 1931, May 1932 to September 1948, and 1957 September to September 1964; miscellaneous measurements in 1911 and some data in 1953. Prior to 1915 records were published under the title "Belly River near Lethbridge". Mean Discharge: (41 years) 3,220 c.f.s. Extremes ~~Recoreded~~: Maximum daily discharge, 135,000 c.f.s. (estimated) on June 1953 (a discharge of 149,000 c.f.s. was obtained on 10 June 1953 by slope area determination). Minimum daily discharge, 134 c.f.s. on 31 August and 12 October 1936. Revisions: Drainage area, WRP 125, Data to 1960, WRP 141. Remarks: Records good. It is reported that the flood of 1908 reached a gauge height of 26.7 feet and a corresponding discharge of about 200,000 c.f.s. Discharge is affected by upstream storage and diversion to irrigation

Year ending Sept. 30	Discharge in c.f.s.				Run off	
	Maximum	Minimum	Mean	Per Sq.Mi.	Depth in inches on Drainage Area	Total in Acre-feet
1926-27	48,900 June	550 Jan.	6,700	1.00	13.57	4,840,000
1927-28	42,500 July	1,040 Nov.	5,720	0.85	11.57	4,150,000
1928-29	39,300 June	480 Aug.	3,400	0.51	6.92	2,460,000
1929-30	14,200 June	263 Sept.	2,810	0.42	5.70	2,030,000
1930-31	8,840 June	206 Aug. or Sept.	1,210	0.18	2.44	879,000
1931-32	22,200 June	382 Sept.	- - -	- -	- -	- - - -
1932-33	15,700 June	280 Oct.	2,870	0.43	5.84	2,080,000
1933-34	32,000 June	360 Aug.	4,000	- -	- -	2,900,000
1934-35	13,600 May	250 Sept.	2,560	0.38	5.16	1,856,000
1935-36	10,340 June	134 Aug.	1,686	- -	- -	1,234,000
1936-37	40,000 June	134 Oct.	2,050	0.31	4.21	1,486,000
1937-38	28,400 May	396 Sept.	3,190	- -	- -	2,309,000
1938-39	13,100 June	200 Sept.	1,780	- -	- -	1,289,000
1939-40	9,460 May	195 Aug.	1,670	- -	- -	1,214,000
1940-41	6,400 June	219 Aug.	1,430	- -	- -	1,036,000
1941-42	82,800 June	358 Feb.	4,920	- -	- -	3,564,000
1942-43	19,350 June	372 Sept.	3,840	- -	- -	2,776,000
1943-44	5,870 June	256 Jan.	958	- -	- -	695,400
1944-45	28,730 June	195 Sept.	2,630	- -	- -	1,907,000
1945-46	17,080 May	369 Aug.	2,590	- -	- -	1,876,000
1946-47	22,650 March	608 Aug.	3,880	- -	- -	2,810,000
1947-48	99,790 June	579 March	6,660	- -	- -	4,837,000
1948-49						
1949-50						
1950-51		NO RECORDS				
1951-52						

Summary of Mean Monthly Discharge in Second-feet of Oldman River

Near Lethbridge

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Total acre-feet
1910-11	- -	- -	- -	- -	- -	- -	- -	- -	- -			8,788	522,894z
1911-121	2,836	2,135z	1,672z	964	896	3,610	7,886	7,883	6,792	6,792	2,953	1,625	2,385,850
1912-13	1,636	1,856z	- -	618	412	451	5,114	9,384	15,725	6,087	3,487	1,952	2,810,130z
1913-14	2,121	1,786	904	671	622	1,122	3,412	8,606	7,928	3,799	1,932	1,616	2,089,000
1914-15	3,999	2,995	1,094	916	722	1,902	3,475	10,500	14,438	9,165	5,107	3,316	3,494,816
1915-16	3,591	2,095	984	801	3,077	3,432	3,751	8,194	23,486	13,588	3,813,	3,154	4,224,493
1916-17	1,811	1,342	1,280	703	796	832	3,587	15,394	21,608	7,806	2,004	1,248	3,531,646
1917-18	1,048	952	652	1,958	1,102	1,774	3,092	7,5[illegible]5	10,853	2,907	1,546	1,402	2,100,943
1918-19	1,419	945	741	641	567	617	2,238	8,549	6,634	2,086	1,064	624	1,590,643
1919-20	664	798	702	649	867	2,085	3,193	10,389	12,855	8,323	2,075	1,270	2,658,087
1920-21	1,453	1,065	762	691	816	1,519	3,341	10,033	12,681	4,281	1,461	924	2,359,089
1921-22	1,587	1,101	891	663	459	547	2,196	9,961	13,113	4,413	1,365	787	2,243,305
1922-23	725	886	463	571	432	718	1,945	7,860	26,903	6,722	2,804	1,817	3,107,143
1923-24	9722	1,046	597	520	759	1,027	1,890	7,280	11,467	3,939	2,114	947	1,968,482
1924-25	941	1,130	1,000	1,220	1,070	2,150	6,240	11,500	10,500	3,470	1,140	1,340	2,519,625
1925-26	2,150	1,370	1,060	722	655	729	2,540	3,000	3,200	1,740	589	3,290	1,280,000
AVERAGE	1,800	1,350	856	821	883	13,800	3,310	9,070	13,300	5,670	2,230	2,140	2,540,000
AVERAGE Acre-t.	111,000	80,30001	52,600	50,500	49,500	84,900	197,000	558,000	791,000	349,000	137,000	127,000	2,590,000

Average run-off per square mile not computed owing to canal diversions.

z Partial record not included in average.

	Discharge in c.f.s.				Run Off	
Year ending Sept. 30	Maximum	Minimum	Mean	Per Sq.Mi.	Depth in Inches on Drainage Area	Total in Acre-feet
1952-53						
1953-54						
1954-55		NO RECORD				
1955-56						
1956-57						
1957-58	14,690 May 14	227 Feb. 8	2,928	- -	- -	2,120,000
1958-59	21,370 June 7	416 Nov. 27	3,650	- -	- -	2,643,000
1959-60	13,430 June 5	215 Sept.18	2,914	- -	- -	2,115,000
1960-61	20,190 May 29	206 Jan. 4	1,958	- -	- -	1,417,000
1961-62	9,140 June 15	288 Aug. 29	2,050	- -	- -	1,487,000
1962-63	30,400 July 1	260 Oct. 4	2,260	- -	- -	1,640,000
1963-64	73,800 June 10	190 Nov. 20	3,760	- -	- -	2,727,000

OLDMAN RIVER REGIONAL PLANNING COMMISSION

909 - 4 AVENUE SOUTH • LETHBRIDGE • ALBERTA • TELEPHONE 328-3371, 328-3372

WHEREAS one of the functions of the Oldman River Regional Planning Commission is the planning of orderly and economical development within the Region;

AND WHEREAS the present water management program within the Region is primarily single purpose in nature, oriented towards irrigation needs, and is providing inadequate flows at various times for non-irrigation purposes in much of the Region;

AND WHEREAS the healthy growth of the Region depends upon both an adequate supply and quality of water for all uses, particularly domestic and industrial water supply, flood control, and recreation;

AND WHEREAS the following studies have been completed:

1. A Review of Water Utilization and Suggested Revisions - Oldman River, Alberta 1968, Gordon N. Haugen.
2. A Study of Minimum Flows in Sections of the Oldman River System, Alberta Department of Agriculture, May 1969.
3. Summary Report, Oldman River, Pollution Survey, 1969-1970, Department of Health.
4. South Saskatchewan River Basin Mean Monthly Streamflow, Hydrology Branch, Water Resources Branch, Alberta Department of Agriculture, June, 1969.

AND WHEREAS the following specific recommendations relative to improving water management within the region have been proposed in the aforementioned studies:

1. It is recommended that a revision of the riparian flows on the

St. Mary, Belly, and Waterton Rivers be undertaken and implemented so as to provide a supply of water for all water users (agriculture, recreation, domestic, and industrial).

(a) Suggested Revisions:

(i) St. Mary River 150 c.f.s. - an increase of 120 c.f.s.

(ii) Belly River 75 c.f.s. - an increase of 45 c.f.s.

(iii) Waterton River 200 c.f.s. - an increase of 170 c.f.s.

(iv) Oldman River 75 c.f.s. - an increase of 35 c.f.s.*

2. It is suggested that a revised reservoir management scheme be implemented that would take into consideration the recreational potentials of the impoundments, so as to provide both a good recreational base and waters for downstream and irrigation uses.

3. It is recommended that the Waterton River and Reservoir be given priority in the suggested revision of riparian flows and in the revision of reservoir management policies, as they appear to have the highest potential value as fishery and recreational areas.

THEREFORE, recognizing this need for a more comprehensive water resource management policy aimed at facilitating the overall needs of the entire Region;

BE IT RESOLVED that the Oldman River Regional Planning Commission request that action be taken to implement the recommendations contained in the several studies undertaken to date.

---

*Measured at Fort Macleod gauge. To be revised to approximately 200 c.f.s. when Three Rivers Reservoir is built.

Carried.

LOCATION OF EXISTING SAND AND GRAVEL LEASES AND APPLICATIONS

Note pages 3 and 4 of Book Two, which have these leases indicated on them and their locations.

There is about 5½ miles of river which starts near the city weir and extends downstream which is almost completely sand and gravel leases.

Note that the sand and gravel zones of depositions are dotted in on the base map completed in 1962 from 1961 aerial photographs.

PAST SAND AND GRAVEL USE DATA

Note attached a compilation of sand and gravel removal which was taken from the sand and gravel returns from Edmonton files. The location of leases can be determined by using pages 3 and 4 of Book Two.

Note also attached a memorandum from Mr. O. Swenson, Aggregates Engineer, about gravel removal by Department of Highways in the Lethbridge area. Most of the Department of Highway pits listed appear to be out of the river bed.

ITEM 187

PROVINCE OF ALBERTA

MEMORANDUM

OUR FILE NO.: 3077

YOUR FILE NO.:

FROM: R. H. Cronkhite
Chief Construction Engineer

TO: B. G. Schuler
District Supervisor
Department of Lands & Forests
Lethbridge, Alberta

DATE: August 4, 1970

Re: Removal of Sand & Gravel from and in The Immediate Vicinity of the Oldman River From the Confluence of the Oldman River and St. Mary River to Approximately Picture Butte.

The accompanying list has been made up as per your request of the third ultimo.

As the upland gravel deposits are all privately owned and may become unavailable for highway use, it is considered vital that the gravel bars remain available for this purpose.

R. H. Cronkhite
CHIEF CONSTRUCTION ENGINEER

Per:

O. Swenson
AGGREGATES ENGINEER

OS:jkg
Encl.

CUBIC YARDS OF SAND AND GRAVEL

SAND AND GRAVEL LEASE [illegible]	LESSEE	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	Total
2089	Lethbridge Concrete Products Ltd.	2,480	1,419 3,159	265	Nil	1,120	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	17,800	900	15,622 34,065	76,830
2088	Lethbridge Concrete Products Ltd.	Nil	Nil	Nil	Nil	2,000	2,200 1,000	Nil	Nil	Nil	Nil	Nil	3,552	16,416 2,000	9,450	Nil	17,800	2,300	Nil	66,196
2133	Lethbridge Concrete Products Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2597	Lethbridge Sand and Gravel Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	5,369	2,500	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	7,869
2041	G. F. Tollestrup										500 1,500	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	2,000
2093	New Lethbridge Sand and Gravel Ltd.	28,592	7,557 9,869 3,159	29,302	8,326	1,180	1,093	1,647	1,449	Nil	Nil	Nil	Nil	1,536	Nil	Nil	Nil	Nil	Nil	93,710
2092	New Lethbridge Sand and Gravel Ltd.												3,216 2,796	15,525	9,990 3,835	Nil	15,555	Nil	Nil	50,917
2068	New Lethbridge Sand and Gravel Ltd.		Nil	745	838	583 774	3,720	2,400 1,701	3,400	Nil	Nil	Nil	11,963	Nil	Nil	9,235	Nil	Nil	Nil	35,358
2730	New Lethbridge Sand and Gravel Ltd.												Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
20[illegible]5	New Lethbridge Sand and Gravel Ltd.									3,023	Nil	Nil	894 2,210	Nil	Nil	11,190	Nil	Nil	Nil	17,317
																		TOTAL		[illegible],147

DATE

T BER	PIT NAME	LOCATION	GRAVEL REMOVAL DATE	CU. YDS	REMARKS
-207	LUCC PIT	SE ¼ 15-8-21-4	AUG-NOV 1960	16,480	[illegible]
			DEC 1960	224	MARCH, 196
-110	WHITNEY PIT	SW17-8-21-4	APRIL 1953	25	
-1575	OLDMAN RIVER #6	N½ & SE¼ 19-8-21-4	DEC 1969	90,895	
-290	(E½) O'SULLIVAN PIT	FRAC E½ 25-8-22-4, FRAC SE 36-8-22-4	NO RECORD OF GRAVEL REMOVAL IN PAST 25		
E-68	O'SULLIVAN PIT	NW.1-9-22-4	OCT. 1968	5,000	ALL GRAVEL REMO FROM RIVER BAR NEAR [illegible] PIT ON EAST SIDE RIVER. THIS BAR NOT INCLUDED IN NAL PIT QUAN
1474	OLDMAN RIVER #5	W½ 1-9-22-4		NO RECORD OF GRAVEL REMOVA	
1477	OLDMAN RIVER #4	N½ 12-9-22-4		NO RECORD OF GRAVEL RE	
-1076	OLDMAN RIVER PIT	SE 13-8-22-4	JULY 1964	15,000	
1476	BOYCHUK PIT	NW 12-9-22-4 SW 13-9-22-4	FEB-MAY 1966	157,081	
			SEPT. 1966	5,122	
			OCT. 1966	2,018	
			JUNE 1967	5,108	
			OCT-NOV 1967	10,450	
			SEPT-NOV 1967	66,564	
			SEPT-DEC 1968	1,096	
			APRIL-JUNE 1968	7,844	
			JULY 1968	1,240	
			JUNE 1968	74,409	

PIT BER	PIT NAME	LOCATION	GRAVEL REMOVAL		
			DATE	CU. YDS.	REMARKS
66-673	PAVAN PIT	NE 24-9-22-4 NW 19-9-21-4	MARCH 1954	9,544	
			AUG-NOV 1960	43,296	
			JULY-NOV 1960	77,771	
			DEC 1960	1,562	
			MARCH 1961	3,999	
			AUG 1961	252	
-413	SWIDINSKY PIT	NW 30-9-21-4 WEST OF OLDMAN R	MAY 1962	1,706	
			AUG-NOV 1968	14,125	
6-1024	BOULTON PIT	S½ 9-10-22-4	JULY-NOV 1960	72,467	
			JULY-SEPT 1961	32,348	
			JAN-FEB 1962	3,000	
			DEC 1968	2,000	
66-359	(WM) RUSSELL PIT	SE¼ & N½ 9-10-21-4 & SEC 10-10-21-4 WEST OF OLDMAN R	JULY-AUG 1951	11,501	
			DEC 1952	13,668	
			NOV-FEB '52-'53	86,500	
			AUG 1953	2,319	
			JUNE-JULY 1955	28,924	
			DEC 1953	75,933	
6-505	BOWES PIT	N½ 22-10-21-4 SE 22-10-21-4	JUNE 1952	2,494	
			JUNE 1955	1,962	
			JULY-SEPT 1959	7,245	
66-160	PICTURE BUTTE PIT	NE. 22-10-21-4	JULY 1968	56,165	
			DEC 1969	55,973	

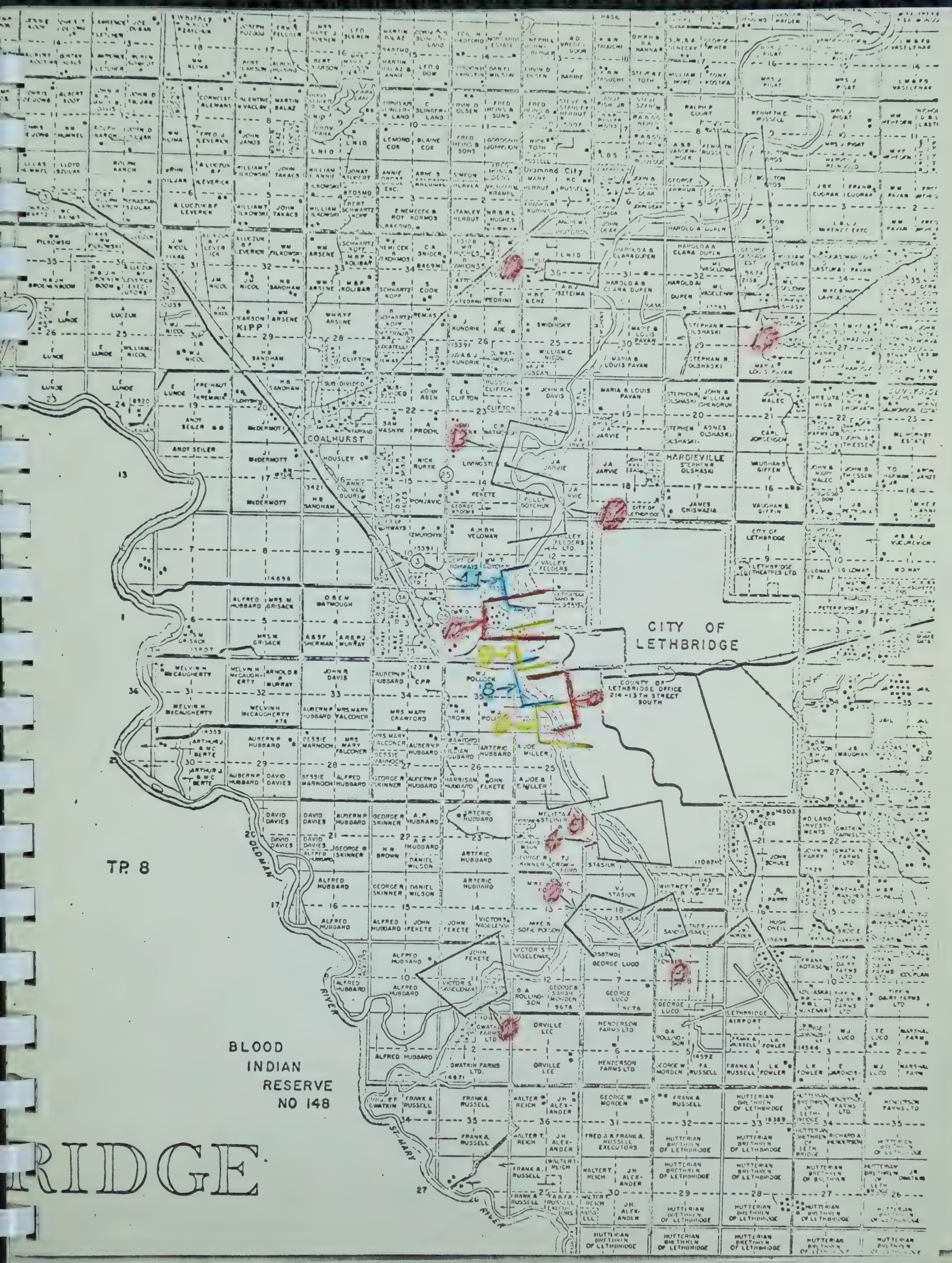
AERIAL PHOTOGRAPHS

ALONG OLDMAN RIVER STUDY AREA

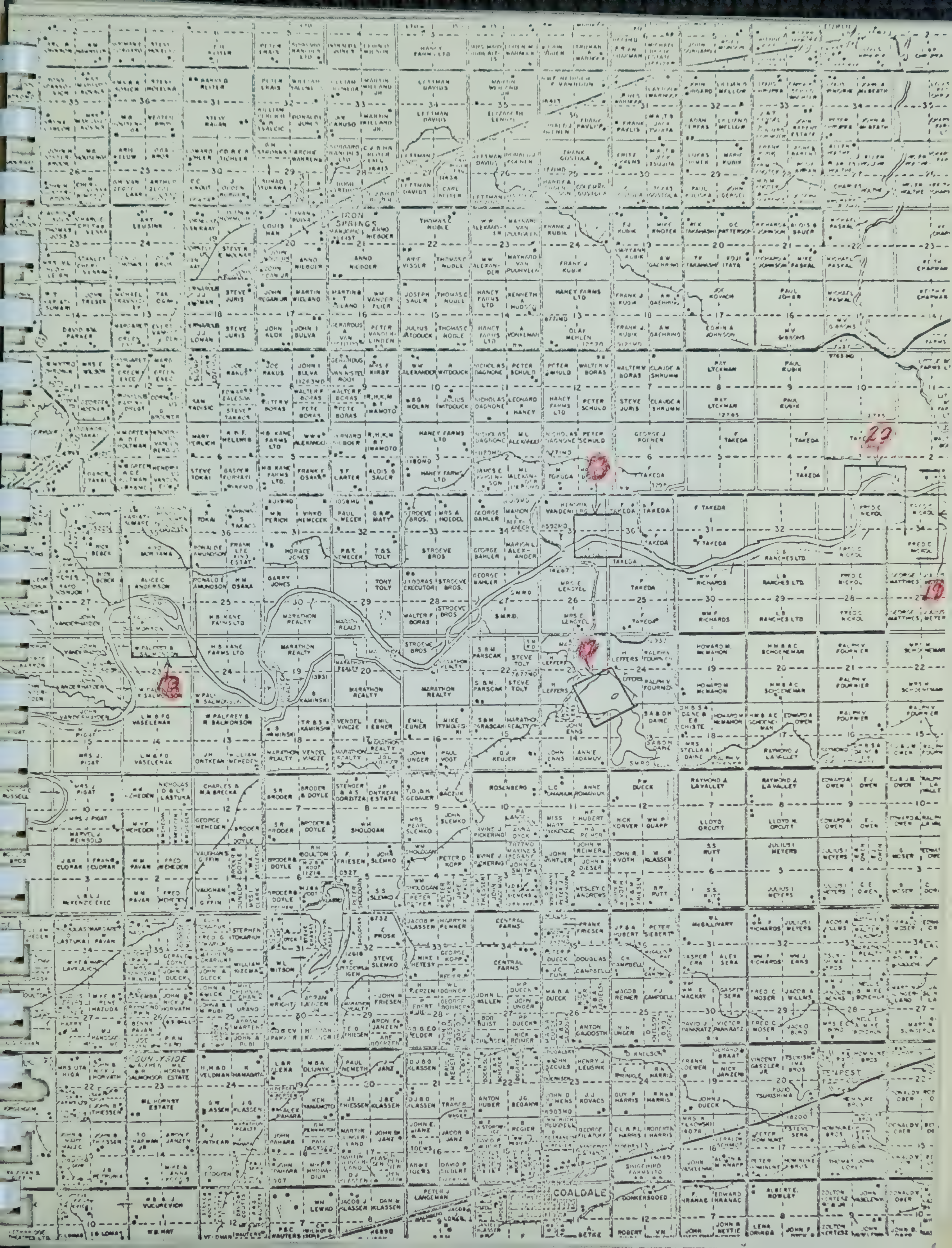
(Taken July 9, 1970)

On the next two pages are maps showing locations of the photographs. The arrow on the map indicates direction each photograph was taken.

1. Photograph #1	Delta at Confluence of Oldman and St. Mary Rivers
2. Photograph #2	County of Lethbridge "no-lease" gravel operation
3. Photograph #3	Whiteal ~~Whitford~~ Sand and Gravel
4. Photograph #4	"Famous" and Controversial Lethbridge Island
5. Photograph #5	Looking North Downstream
6. Photograph #6	City Weir and Water Plant
7. Photograph #7	Tollestrup Gravel Works
8. Photograph #8	Indian Battle Park
9. Photograph #9	Crown Land Recently Sold to the City
10. Photograph #10	Highway Interchange
11. Photograph #11	Site of Proposed Secondary Sewage Treatment Plant
12. Photograph #12	Boychuk Gravel Pit
13. Photograph #13	Mannix (formerly Jarvie) Sand and Gravel plus John R. Davis
14. Photograph #14	Irrigation Spill-water Erosion
15. Photograph #15	Irrigation Spill-water Erosion
16. Photograph #16	Picture Butte Island
17. Photograph #17	C.P.R. Lake (sedimentation from irrigation spill-water)
18. Photograph #18	Drop Structure Installed Near Nolan Bridge
19. Photograph #19	River Course and Nickols' Farmstead
20. Photograph #20	Area County Wanted Sand and Gravel Lease near Nickols'

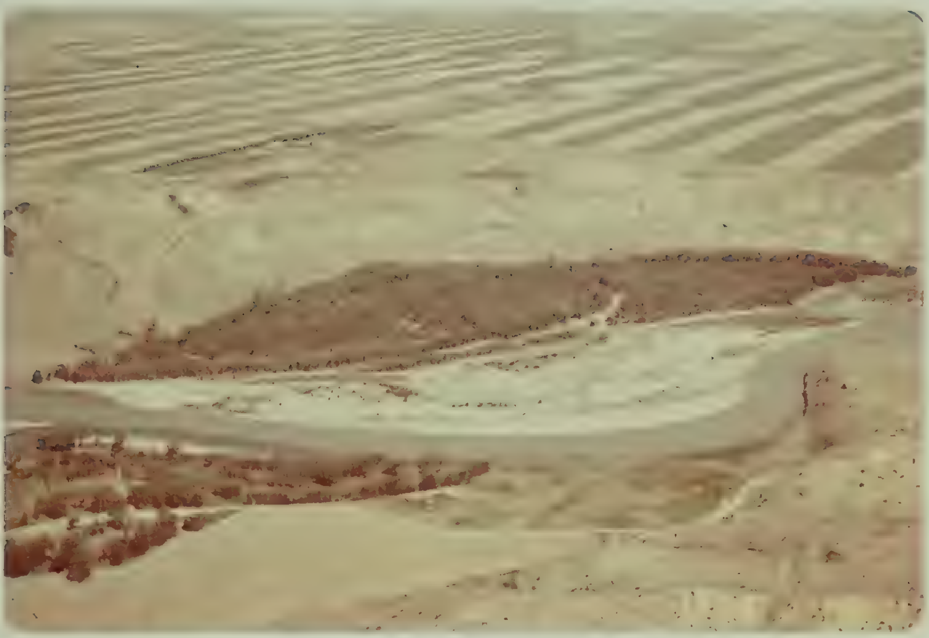

Diamond City
KIPP
COALHURST
HARDIEVILLE
CITY OF LETHBRIDGE
COUNTY OF LETHBRIDGE OFFICE 214-13TH STREET SOUTH
LETHBRIDGE AIRPORT
CITY OF LETHBRIDGE
LETHBRIDGE THEATRES LTD.
VALLEY FEEDERS LTD.
DEPT OF HIGHWAYS
JAIL
TP. 8
BLOOD INDIAN RESERVE NO 148
OLDMAN RIVER
ST. MARY RIVER
HUTTERIAN BRETHREN OF LETHBRIDGE
GWATKIN FARMS LTD.
HENDERSON FARMS LTD
13
12
11
8
6
3
13

RIDGE


IRON SPRINGS
SUNNYSIDE
TEMPEST
COALDALE
HANEY FARMS LTD
MARATHON REALTY
STROEVE BROS
TAKEDA
LB RANCHES LTD
CENTRAL FARMS
13
22
19
17
13

PHOTOGRAPH #1

Delta at Confluence of Oldman and St. Mary Rivers

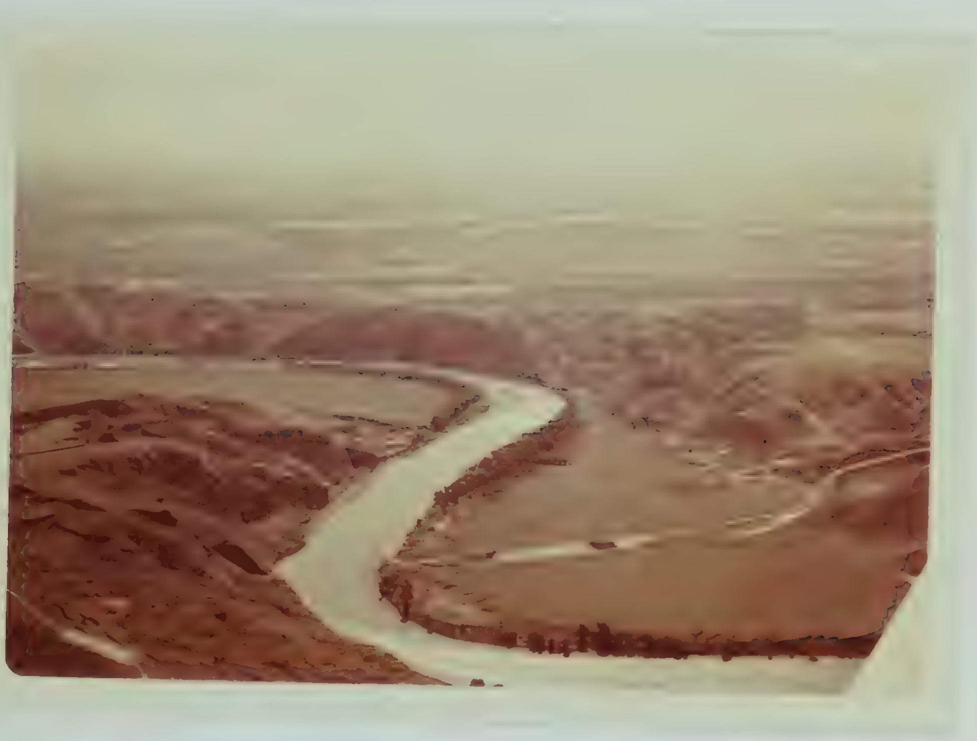


This open bar contains approximately 500 thousand yards of sand and gravel according to Mr. Tollestrup.

Note: the water on the close side of the river is clear. The clear water is from the St. Mary River. The Oldman River is quite turbid.

PHOTOGRAPH #2

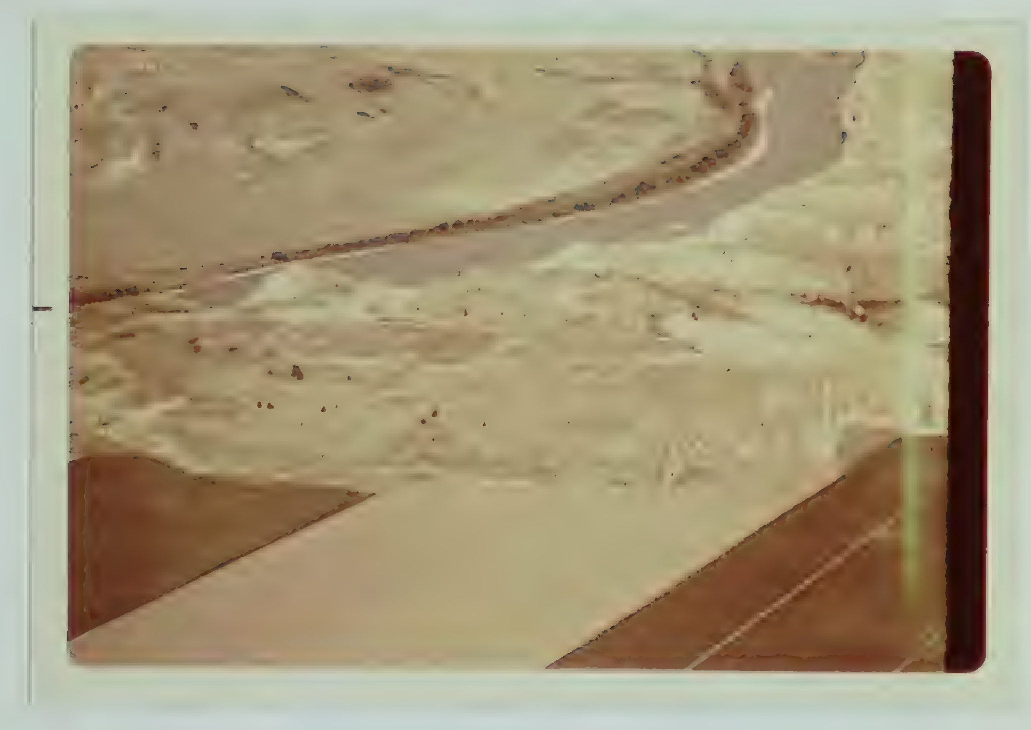
County of Lethbridge "no-lease" Gravel Operation



The county has applied for a lease in this area but has not been granted one to date. The county has authority to remove gravel due to a reservation they hold on this area, according to information I received from the Edmonton office.

PHOTOGRAPH #3

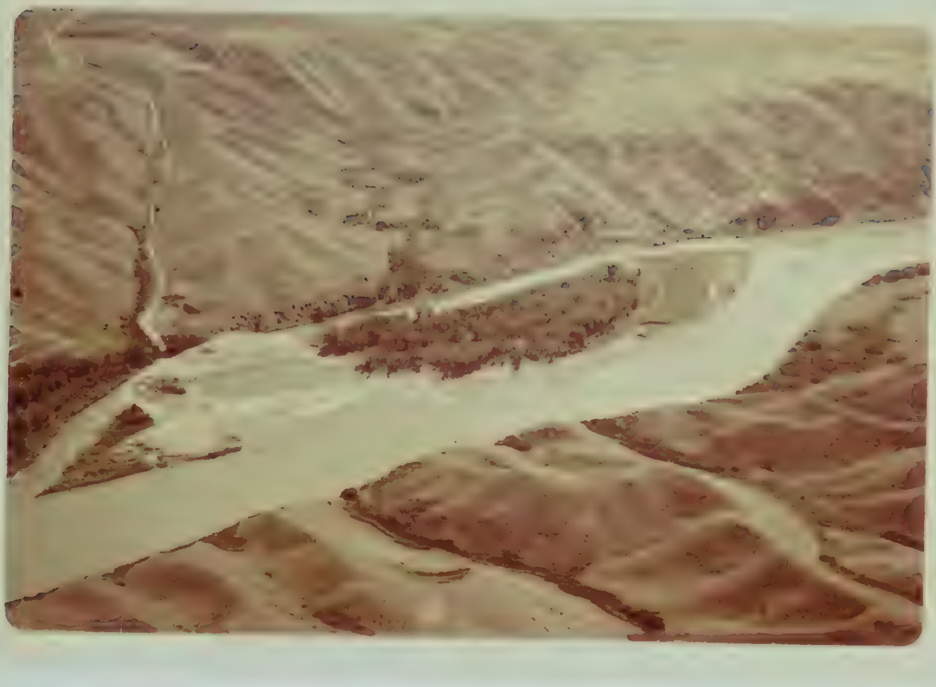
Whitney
~~Whitford~~ Sand and Gravel



This photograph shows what a more or less used out upland gravel mining area usually looks like. Proper technique when removing the material could have left this land in a useable condition at very little extra cost. Cost to reclaim this land now would be in the vicinity of $500.00 per acre.

PHOTOGRAPH #4

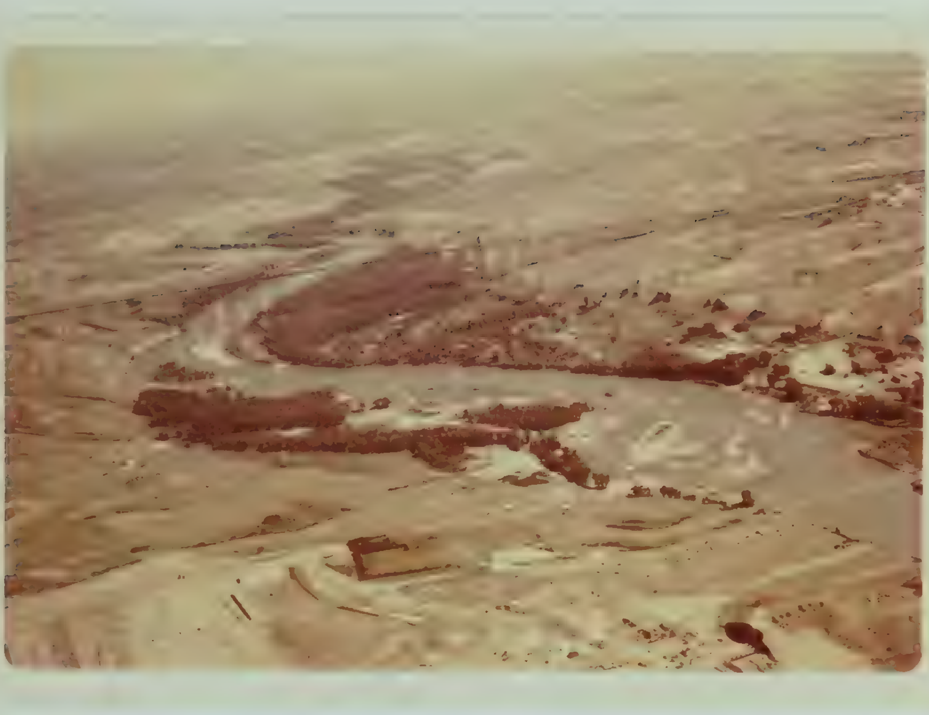
"Famous" and Controversial Lethbridge Island



Over-reaction by conservation types and lack of consideration of their concerns by the Department of Highways and the ensuing conflict of interest have made this island famous. New clearing and operation at the other end of the island has recently renewed the animosity between the groups.

PHOTOGRAPH #5

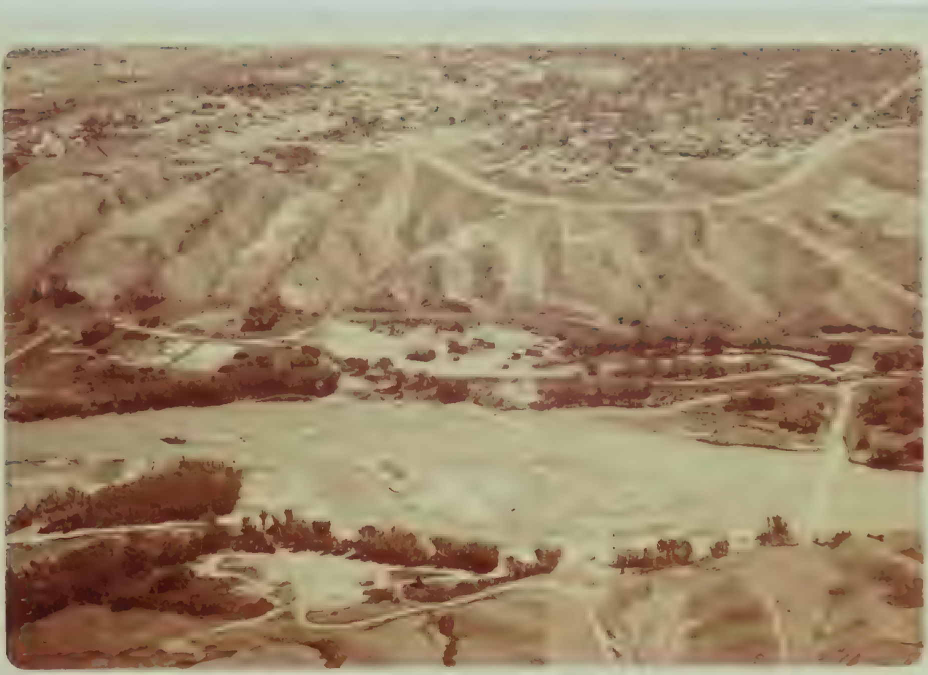
Looking north downstream



This photograph shows the meandering of the stream from the city weir downstream. The site of the University of Lethbridge is in the foreground of the photo.

PHOTOGRAPH #6

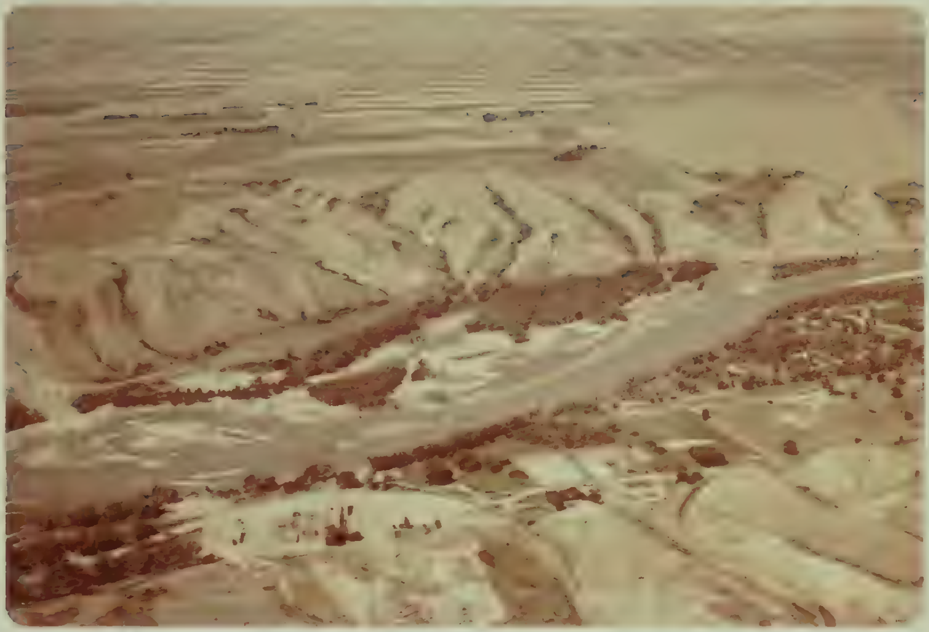
City Weir and Water and Power Plant



Tollestrup Sand and Gravel operations near the Weir and new City River Services Crossing have caused concern by the city engineers.

PHOTOGRAPH # 7

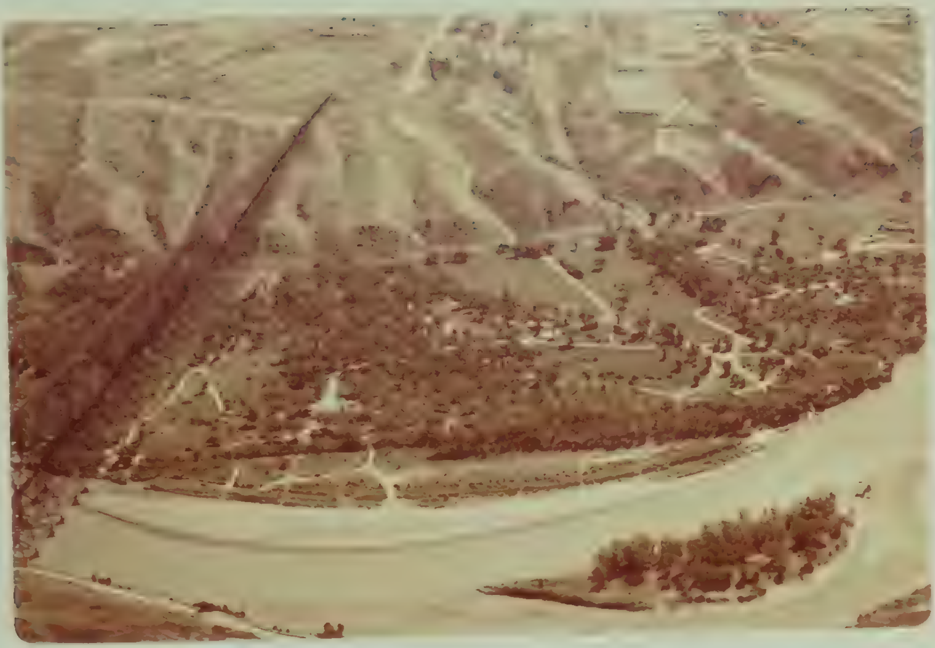
Tollestrup Gravel Works



This is a partly instream gravel operation which is very close to the new university site as well as Indian Battle Park. Note its unsightliness.

PHOTOGRAPH #8

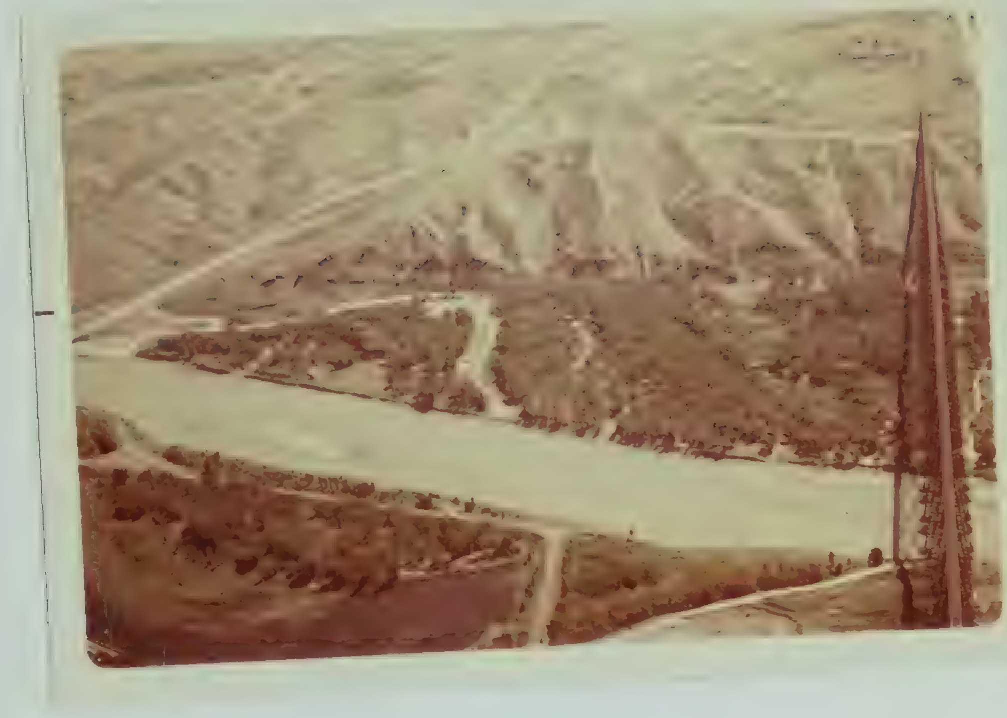
Indian Battle Park



This park is partly developed and is a beautiful site . It is bounded on the north by the rather famous Railway Bridge and on the south by the city water and power plant.

PHOTOGRAPH #9

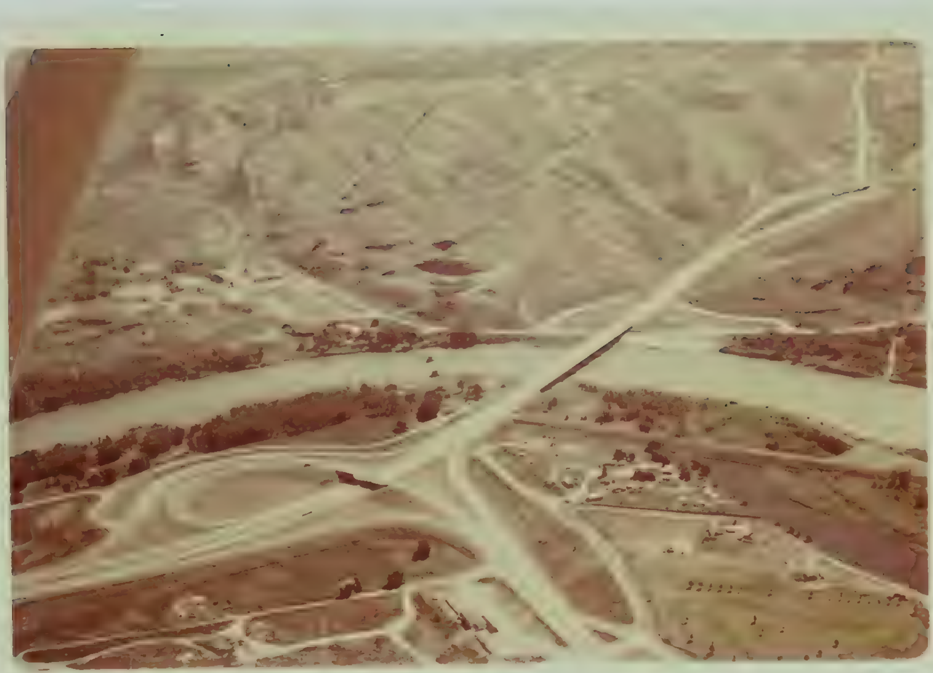
Crown land recently sold to the city



The treed flood plain on the far side of the River was recently sold to the city at a token price to extend Indian Battle Park which lies just south of this land. The River channel in this area was dyked on the west side by the Department of Highways. The River in this picture was dredged and straightened to ensure the permanence of the upstream bridge. Gravel operations in this area - if properly carried out - add to the stability of the stream at the bridge site according to Highways and Water Resources Engineers.

PHOTOGRAPH #10

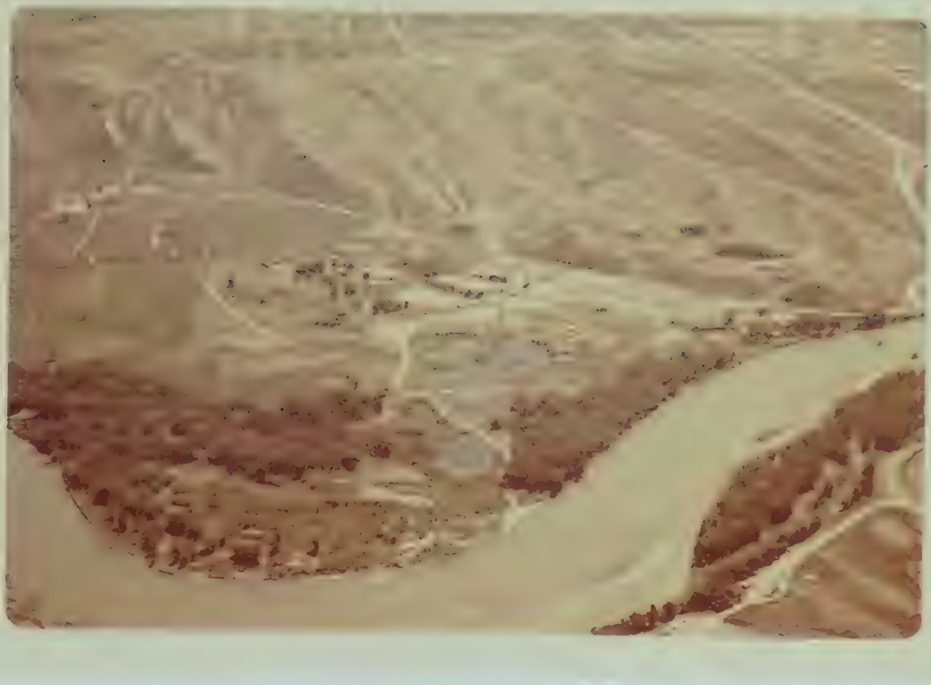
Highway Interchange



Note the old unused piers which is where the river flow at Lethbridge is gauged. The highway river dyke and old river channel can be seen south of the highway in the right hand corner of the photograph.

PHOTOGRAPH #11

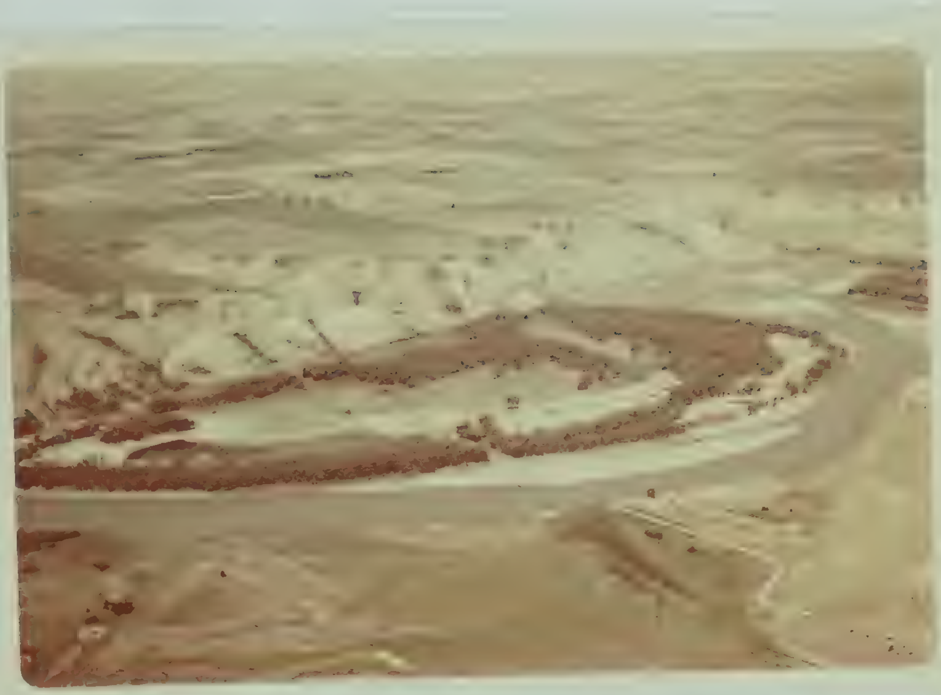
Site of Proposed Secondary Sewage Treatment Plant



Note the old used out gravel operation plus the large feedlot on the left part of the picture. This is a poor site for a feedlot as it contaminates the river water.

PHOTOGRAPH #12

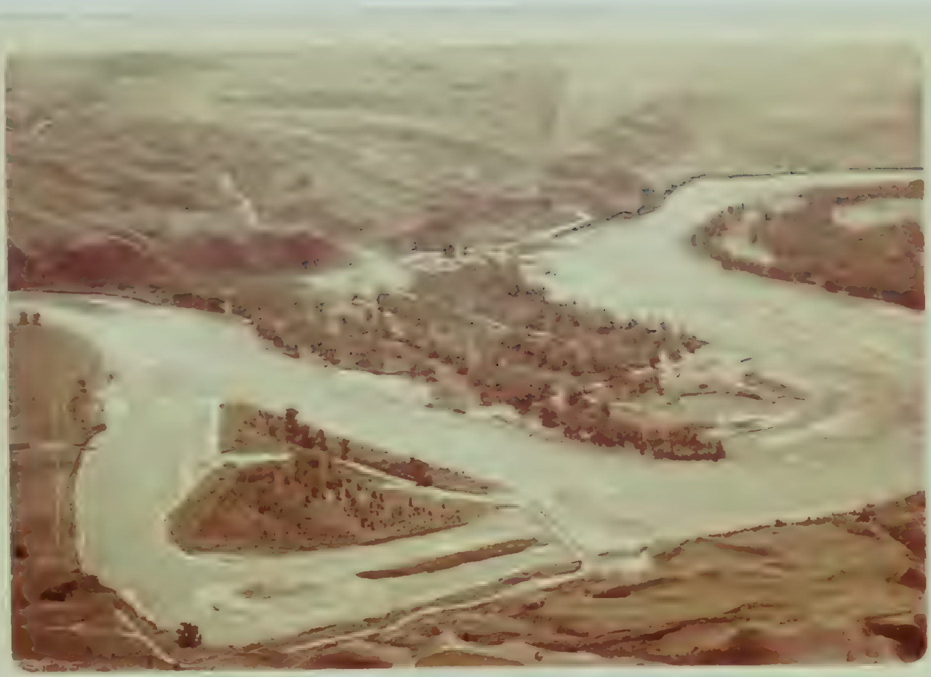
Boychuk Gravel Pit



The Department of Highways has removed a considerable amount of gravel from the pit on the far side of the stream on the river flat.

PHOTOGRAPH # 13

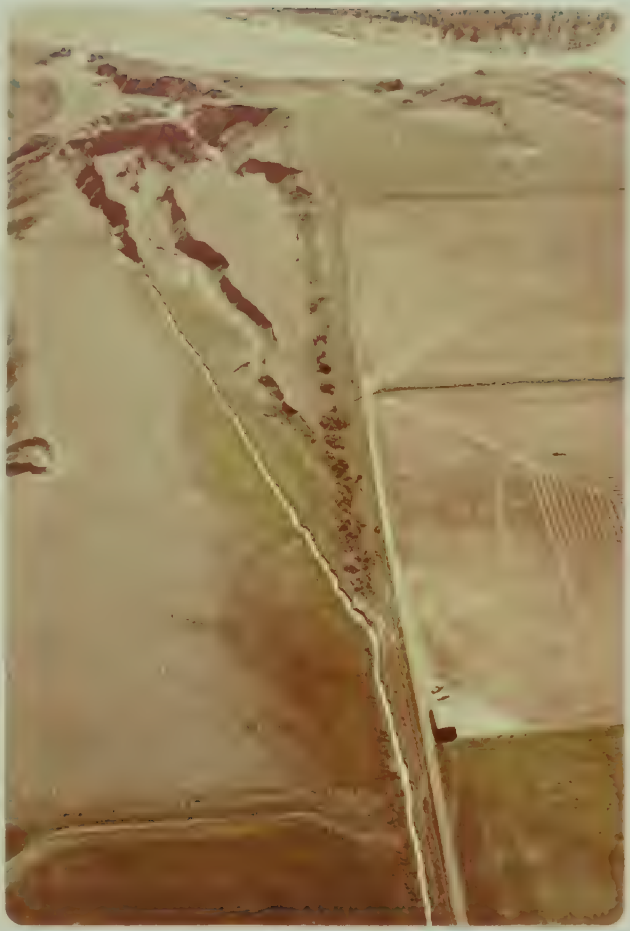
Mannix (formerly Jarvie) Sand and Gravel plus John Davis



Mannix operates on the far side of the river. Davis who owns the Island, claims this Island was formed due to a power companies disturbance of the stream. Davis or the county have constructed the dyke in this picture which Mannix objects to. Eventually either Mannix or Davis will lose their property to the River.

PHOTOGRAPH #14

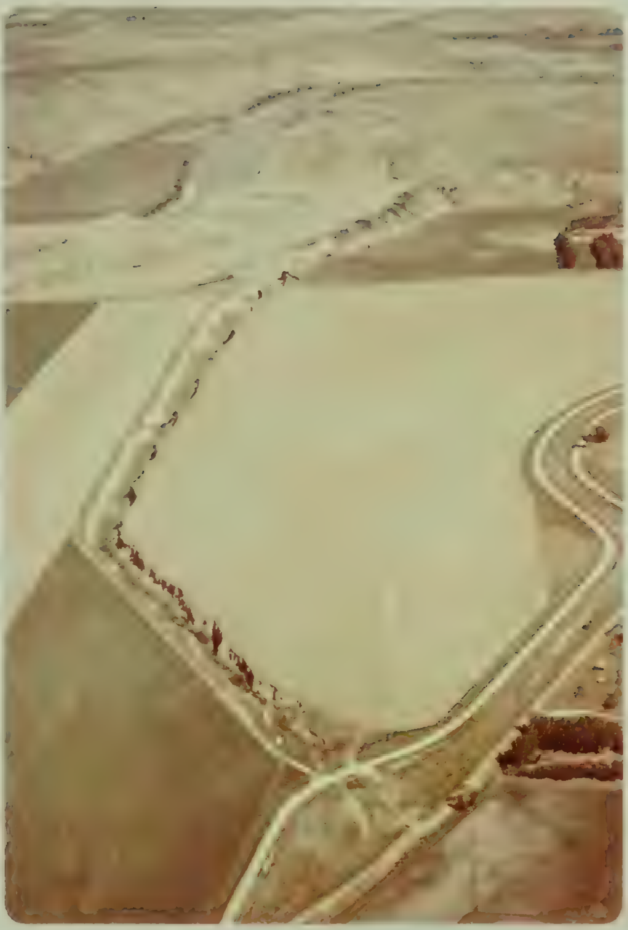
Irrigation Spill-water Erosion



Due to lack of suitable drop structures to the river for irrigation spill-water this erosion occurs. Good land is lost as well as detrimental stream sedimentation.

PHOTOGRAPH #15

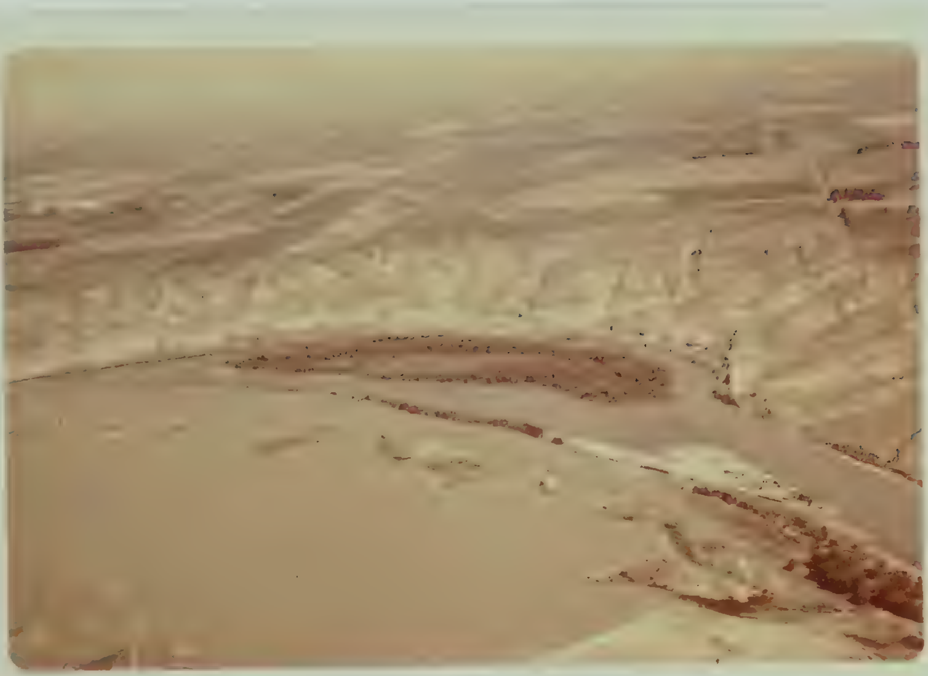
Irrigation Spill-water Erosion



Proper irrigation spill-water drop structures in sites like this certainly should be more economical than the amount of land lost plus severance of land. This erosion would likely have taken out the road. No water from irrigation has been run down this deep gully since about 1960.

PHOTOGRAPH #16

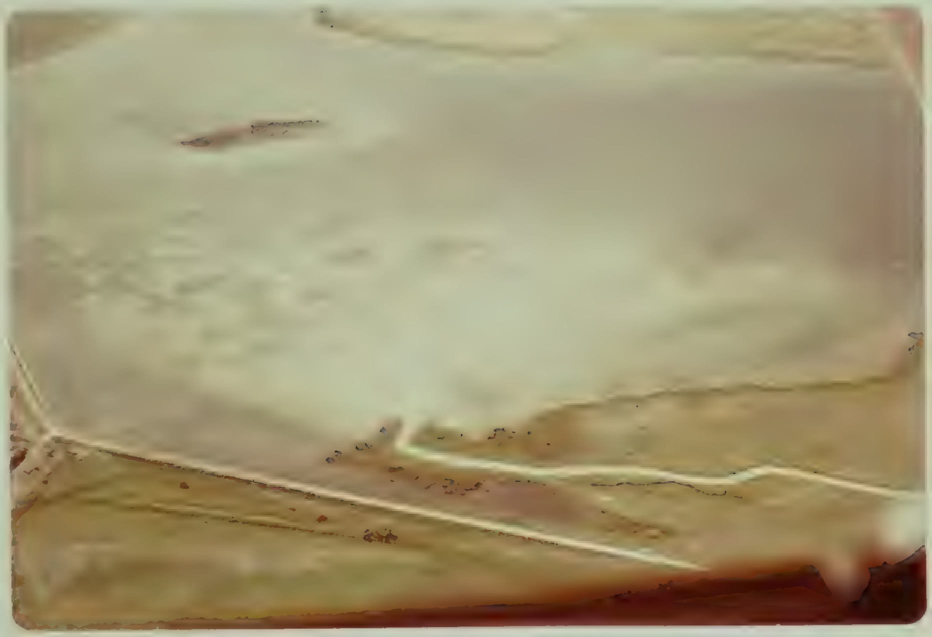
Picture Butte Island



The County of Lethbridge intends to remove gravel from this island which is privately owned. The Department of Highways has done a feasibility survey for a road to this island down the far river bank.

PHOTOGRAPH #17

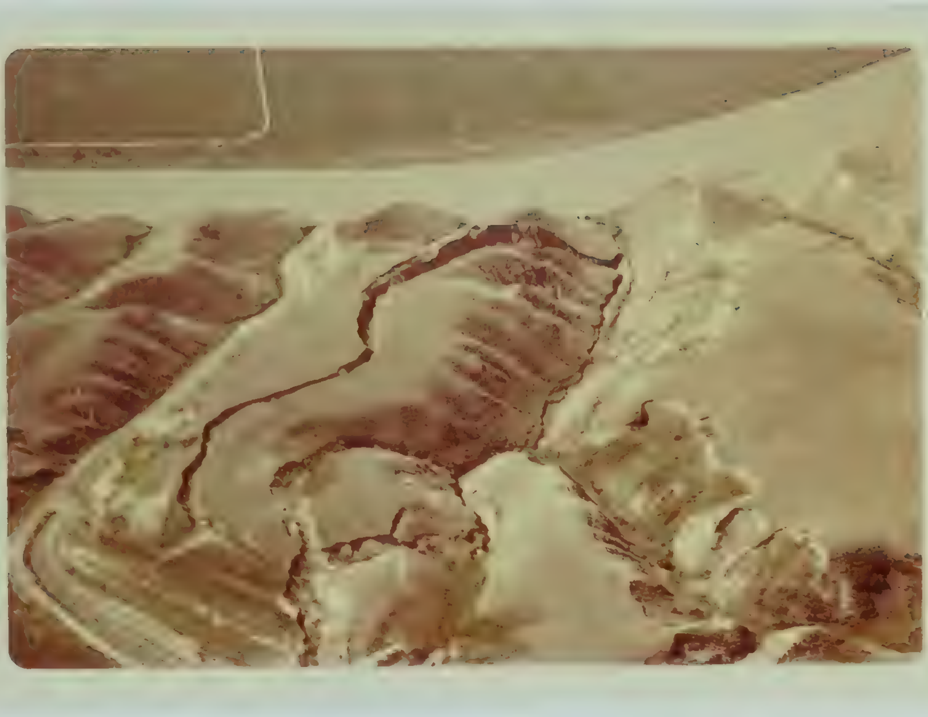
C.P.R. Lake (sedimentation from irrigation spill-water)



Note the amount of sediment going into the lake at this spill-water site. The amount of sediment going into the river would likely be more than at this site due to the material eroded from the river banks.

PHOTOGRAPH #18

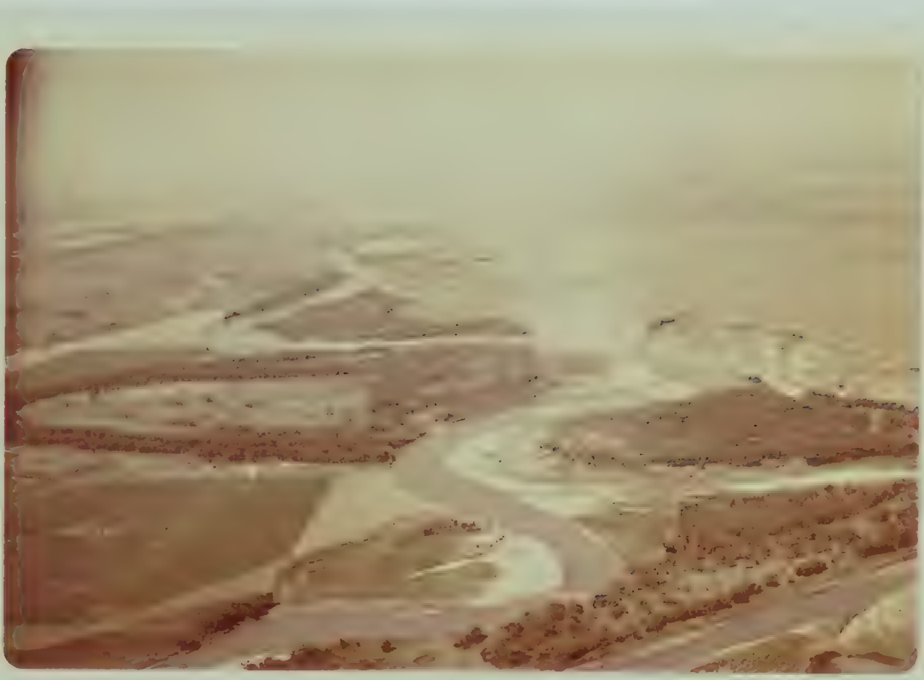
Drop structure near Nolan Bridge



After rather severe erosion at this site an underground spillwater drop structure was installed. Sedimentation from gravel operations are minimal when compared to sedimentation for irrigation.

PHOTOGRAPH #19

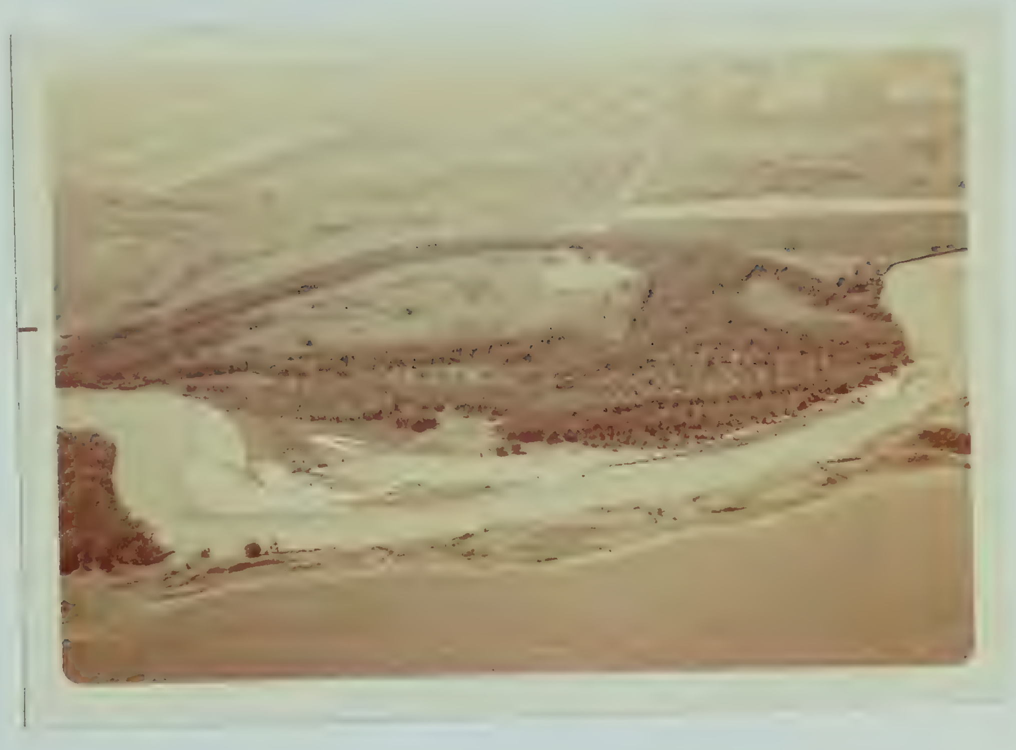
River course and Nickols' farmstead



This building site could be washed away in a high flood or eventually by the cutting of the present stream. The stream could be stabilized in this area by a planned gravel removal system. Stabilization in this area may be deleterious downstream.

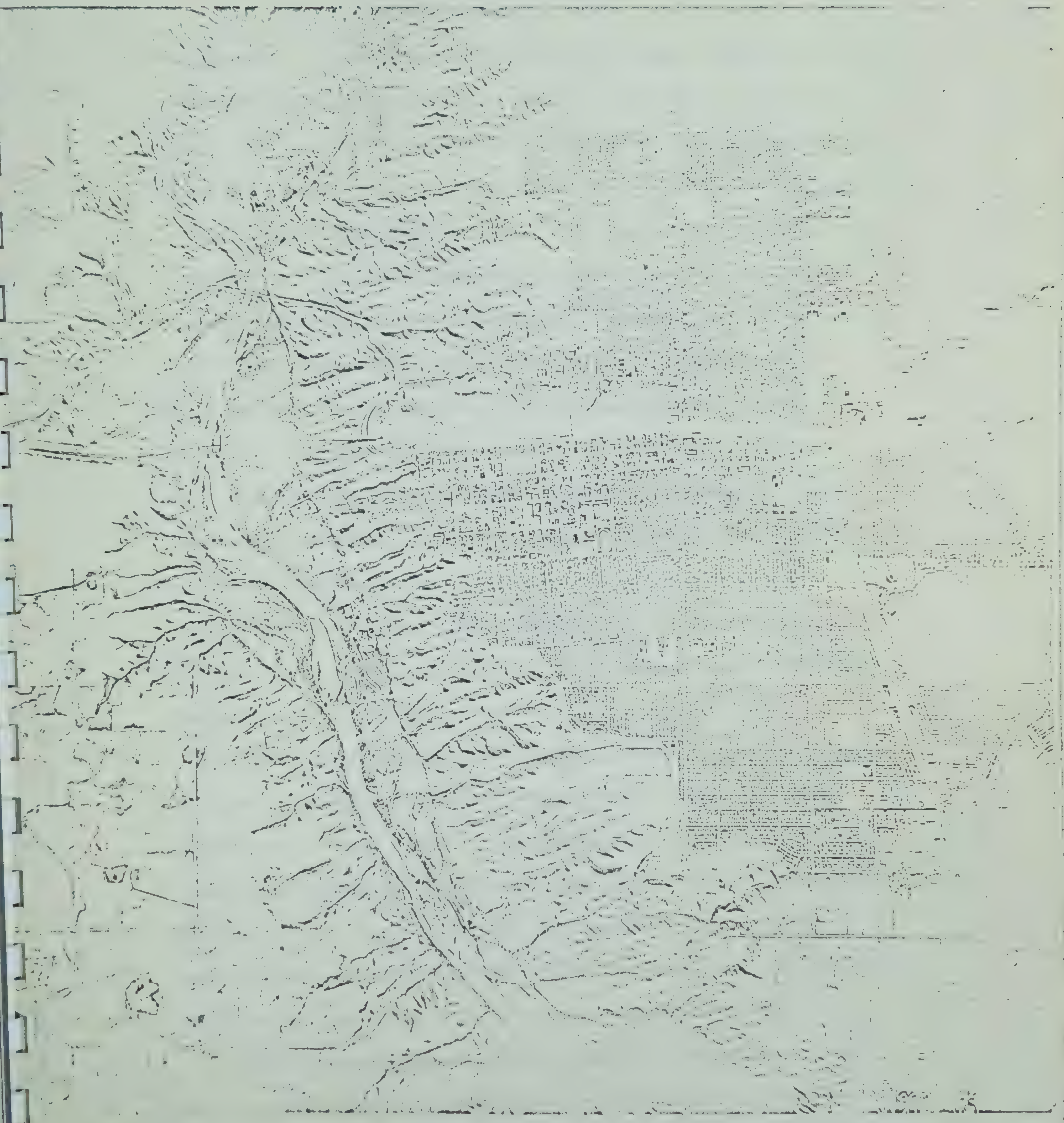
PHOTOGRAPH #20

Area on which County of Lethbridge wanted a Sand and Gravel Lease near Nickols.



The County wanted to remove gravel from this river bar. I don't know why the County removed large poplar trees as they ~~has~~ have an established site for a stockpile near the road on the road allowance. Gravel removal in this area would not be beneficial or deleterious to Nickols' farmstead in my opinion.

1961 AERIAL PHOTOGRAPH OF CITY OF LETHBRIDGE PLUS OLDMAN RIVER IN THIS AREA



STREAM AND BANK CHANGE OVER TIME

For this part of this report, I refer you to pages 5 to 10 of Book Two. The base topographical map was made from 1961 aerial photographs. Also included is an overlay from 1970 photographs as well as one plotted from 1950 photographs. A third overlay was made from the 1917 survey plans which were compiled from surveys done in 1883, 1884, 1889, 1906, 1911, 1915, and 1917 in this area. The Technical Divison, Department of Lands and Forests provided the overlays and base map. The contour base map had been prepared for a study completed by the Research Council at Edmonton. Mr. Doug Fontaine fo the technical division supervised the work. His efforts and co-operation are very much appreciated by me.

The tops of the river banks have changed little since the survey was completed. The banks themselves have a varying relief due to the inherent stability of the soil along the banks of this river. These banks will likely remain much the same for the next hundred years except in some areas where they may be undercut due to meanders in the river stream.

The river bed itself has changed considerable over the past 87 years. There has been little change in the streambed itself since 1950 to date. There is considerable change from the time of survey as compared to the state of the river in 1961. The biggest change in this stream is at the confluence of the St. Mary and Oldman Rivers. Another location where there is considerable change is the river at 13-9-22-W4 just west of Hardieville.

The river was channeled and a duke was constructed on the west side just south of the highway interchange. This is evident on photographs 9 and 10 in this book. This is located in SW 1-9-22-W4.

COST OF REMOVAL OF MATERIAL FROM ALTERNATE UPLAND AREAS

I checked into the cost of bringing gravel in from suitable upland sites by railway and truck. The river does not have a suitable flow of water to consider moving gravel by barge or other watercraft.

There are large good quantity deposits at both Fort MacLeod and Milk River. Carload rates of 160,000 lbs. are from

Fort MacLeod 15 cents per c.wt.

from Milk River 17 cents per c.wt.

Gravel averages 2750 lbs. of gravel per cubic yard. The frieght charges would work out to $4.125 per cubic yard from Fort MacLeod and $4.675 per yard from Milk River. There would be about 58 yards of gravel in a carload. The cost per carload varies from about $240.00 to $270.00 per carload depending on location. Cost of handling would be higher as compared to a trucking operation.

For trucking the going Department of Highways rates in this area are 6.8 cents per ton mile of haul. The loading cost used by department of highways is 27 cents per ton. Fort MacLeod is about 33 miles and Milk River is about 55 miles away. Per yard, the cost would be:

$$\text{Fort MacLeod} = \frac{2750}{2000} \times 6.8\text{¢} \times 32 = \$2.99 \text{ per yard}$$

$$\text{Milk River} = \frac{2750}{2000} \times 6.8\text{¢} \times 55 = \$5.4 \text{ per yard}$$

The cost of gravel delivered in Lethbridge is:

6 yard load, pit run $2.30 per yard

6 yard load, crushed 2" $2.75 per yard

6 yard load, crushed 3/4" $2.95 per yard.

The purpose of this man-made stream change was to force the river directly at the bridge piers and prevent undermining of the bridge. There are two leases in this area, one being 2092 and the other 2093.

Note photograph 5 and 13 of this report and comments thereon. The island in photofraph 13 will be likely washed away due to the dyking of the river. It would appear that much of this island (which Mr. Davis claims to own) is actually in the old former river bed when the original survey was completed and possibley should be considered as crown land. Note 1916 overlay on 1961 base map on page 6 of Book Two.

Most of the gravel removed in this stream has been removed in the past 20 years. The river has been reasonably stable during that time according to the overlays prepared from the aerial photographs. The amount of gravel removed in relation to the amount in the stream is infinitesimal.

It is easy to see that the cost of gravel would be about double the present charge in Lethbridge. An average 1200 square foot house uses about 70 yards of sand and gravel. House construction is one of the smaller uses of sand and gravel in this area. The paving of the new road from just west of Lethbridge to Monarch used up about 200,000 cubic yards of sand and gravel. Most of this gravel is river gravel taken from the Oldman River.

OTHER DISCIPLINES OPINIONS AND OBJECTIVES

The following is a list of people I contacted. I received written submissions from those marked with a * which are included after this page. I will give my interpretation of those people's opinions which did not make a written submission. The report from the Oldman River Regional Planning Commission includes opinions and objectives of those contacted representing the City of Lethbridge.

(1) Mr. R.J. Knight, District Engineer, B.R.D.

* (2) Mr. S. Ho, Planner for the Oldman River Regional Planning Commission

* (3) Mr. Gordon Haugen, Regional Fisheries Biologist

* (4) Mr. Morley Barrett, Regional Wildlife Biologist

(5) Mr. E.A. Lawrence, City of Lethbridge Engineer

(6) Mr. Bill Brown, City Parks and Recreation

* (7) Lethbridge Concrete Products

(8) New Lethbridge Sand and Gravel

* (9) Mr. W.R. Madill, Secretary-Treasurer for County of Lethbridge No. 26

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OLDMAN RIVER REGIONAL PLANNING COMMISSION

1003 - 4 AVENUE SOUTH • LETHBRIDGE • ALBERTA • TELEPHONE 328-3371
328-8871

Refer to file: 70-10-889. October 30, 1970.

Mr. B. G. Schuler,
District Supervisor,
Department of Lands and Forests,
Room 403, Administration Building,
LETHBRIDGE, Alberta.

Dear Mr. Schuler:

Re: Oldman River Land Use Study.

Thank you for your letter of October 26, 1970 together with Books One and Two of your study on land use in the Oldman River. They are very illuminating and informative and our office would surely like to have access to a copy of them when they are finalized.

2. Regarding land use along the Oldman River within the City of Lethbridge, we are of the opinion that the coulees and riverbottom land should essentially be reserved for open space and recreational uses or for certain types of development which are recreation-oriented. Public access to this river valley area is important and a common policy towards the acquisition of access paths should be adopted by the various government agencies having jurisdiction over land use in the area.

3. About gravel operations in the river channel within the City limits, we would suggest that these operations should, if possible, only be carried out in conjunction with any required river training or channel stabilization programs and should not be on a commercial basis. Renewal of sand and gravel leases in this area is therefore not desirable. With regard to applications for leases outside the City boundaries, it is suggested that possible effects downstream on the river banks should be taken into consideration. In this connection, a stream hydrology study utilizing a scale model to study the effects of various possible operations and different rates of river flow might be worthwhile.

4. Regarding gravel operations in the river which might effect the interest of the City Engineering Department, the City Engineers have suggested that the following items should be included in any policy involving the future development of the river:

continued....

(a) Any development of this riverbottom area should provide for the protection of the Diversion Weir and canal system upon which the City relies for its water supply.

(b) Protection should be provided for the water supply lines and sanitary sewage siphon lines that traverse the river north of the diversion weir.

(c) All gravel removing operations in the area of the future proposed bridge crossing should be discontinued since bridge abutments may require replacement of any gravel that is now taken out.

(d) If gravel is to be removed it should be done to the benefit to the ultimate development of the area. Such items as the gravel removal to preserve the channel to the City's water supply canals would be desired and beneficial to the City.

6. This office fully concurs with the points mentioned in page 7 of Book One of your study concering things which could be done to improve the situation. A hydrology study of this section of the river, as mentioned in paragraph 3 above, may also help to achieve the aims you have in mind.

7. As part of your study is in the form of photographs, the following are our observations on some of them:

Photo No.	
1.	land on top of the coulees on the north side of the river has been proposed as a suitable location for country residence area. Any development along the riverbottom should therefore take this aspect into consideration.
3.	this might be a suitable location for the activities of the motorcycle clubs. The used-out gravel mining area therefore might not need to be reclaimed in this case.
6. & 7.	ideally gravel operation in this area should be restricted to work in association with river training and channel stabilization only.
11.	potentials exist for restoring this used-out gravel area for some beneficial recreation-oriented use.
12. & 13.	both of these treed riverbottom lands are suitable for recreational use and have been included in the River Valley Development proposal now before City Council.

continued....

16. although this island is privately owned, the possibility of converting it into a public recreational area should not be overlooked.

19. & 20. public access into sections of this area should be the long-term aim of any future regional recreational study.

It is hoped that the foregoing will be of some use to you and may I mention once again that we would appreciate receiving a copy of your study when it is finalized.

Yours truly,

S. Ho, M.T.P.I.C.,
Associate Planner,

for Executive Director.

SH/ds

cc: Superintendent of Parks and Recreation,
Engineering Director.

OFFICE OF
PARKS AND RECREATION DEPARTMENT

YOUR FILE
OUR FILE

LETHBRIDGE,
ALBERTA

November 27, 1970

Mr. B. G. Schuler
District Supervisor
Department of Lands and Forests
Room 403, Administration Building
Lethbridge, Alberta

Dear Mr. Schuler:

I appreciated the opportunity to discuss the Lethbridge River Valley Development with you, and I am sure that such discussions at a local level will serve to establish good land and resource use policies.

It appears to be essential that aesthetic and ecological considerations should be major factors when decisions about land use are made. The fact that gravel operations can create noise, dust, and visual disturbances far beyond the limits of the operation are important factors as are the down stream effects of work on river banks or channels.

A major concern is the rehabilitation of previous gravel operation areas to a state consistent with suitable future uses. The possibility of controlling the channel of the river within the City boundaries should be studied. This might show that some gravel operations can be consistent with good channel and down stream management.

In general, I agree with Mr. Ho's comments in his letter of October 30th to you.

Yours truly,

W.M.Brown

W. M. Brown
Supt. Parks and Recreation
City of Lethbridge

WMB:gis

cc: Mr. S. Ho

ITEM 187

PROVINCE OF ALBERTA

MEMORANDUM

OUR FILE NO.:

YOUR FILE NO.:

FROM: G. N. Haugen
Regional Fishery Biologist
Lethbridge, Alberta

TO: B. Schuler
District Superintendent of Lands
Lethbridge, Alberta

DATE: November 9, 1970

RE: SAND AND GRAVEL REMOVAL - OLDMAN RIVER

I have reviewed reports 1 and 2 concerning sand and gravel removal from the water influence zone of the Oldman River in the vicinity of Lethbridge. The reports present a historical review of the sand and gravel operations but in no way justify the present mode of operation and I am certain that without the concern of conservationist groups in the Lethbridge area a review of the sand and gravel operations in the water influence zone would not have been requested by your Edmonton office.

It was suggested that the economic of sand and gravel operations make it imperative that the water influence zone of the Oldman River be used as a source for these aggregate materials. If our society were to take a similar stand in other problem areas whereby economics were the only criteria to be used our environment would be in a sad state of affairs, e.g. sewage treatment, industrial stack ommissions, etc. I would suggest that you make every effort possible to recommend that sand and gravel operations be kept at least two chains from the water influence zone of the Oldman River.

If sand and gravel operations are not to be kept outside the water influence zone the detremental effect to the ecology of the river will be continued and to say that there is no problem as other agencies are contributing to the degradation of the river in that raw sewage and irrigation return ditches are flowing freely into the river is by no means a scape-goat for allowing sand and gravel operations to continue.

These are my comments and I am sure they will certainly conflict with yours.

G. N. Haugen

GNH:gjj

Regional Wildlife Biologist

MWB/bjb

GOVERNMENT OF THE PROVINCE OF ALBERTA
DEPARTMENT OF LANDS AND FORESTS
Fish and Wildlife Division
104 Administration Building
Lethbridge, Alberta

November 4, 1970

Mr. B. G. Schuler
District Lands Supervisor
Department of Lands and Forests
Lethbridge, Alberta

Dear Bob:

Following are some comments on your report entitled "Oldman River Land Use Study". First of all, I find it quite difficult to appraise the impact of your report as you have included neither conclusions nor recommendations. Consequently, this means each reader must subjectively interpret what you are trying to say.

Your economic evaluation and subsequent justification of river-bed mining is a little disappointing to me. Certainly, it may cost more to bring gravel in from other sources, but this is the price we must pay to avoid most of our industrial pollution problems. To cite an analogy, it is definitely cheaper to dump raw sewage into a watercourse than to install treatment facilities.

You suggest that gravel removal may be essential to stabilize the stream channel for bridges etc. and common sense dictates that removal in those cases is justified. Gravel operations which do not fall in the above category should be carefully reviewed and in most cases, I suggest, be eliminated. I think that it is essential to determine the silt load etc. added to a river from mining before anyone can intelligently evaluate the industries' impact on the water course. Without the above information much discussion on this topic is purely academic.

With regards to wildlife, I feel it is essential to preserve as much tree and shrub cover in the river bottom as possible. These river breaks and coulees provide approximately 90% of the winter cover for deer and bird game on the prairies. I strongly urge that the above mentioned forms of wildlife habitat be left undisturbed when sites for sand and gravel operations are selected.

Thank you for the opportunity to review your report and to comment on it.

Sincerely,

Morley

Morley W. Barrett
Regional Wildlife Biologist

MWB/bjb

9th Avenue & 6th Street North

328-9251
Telephone ~~327-4375~~
~~327-2765~~
~~327-8106~~

Lethbridge Concrete Products Ltd.

P.O. BOX 667
LETHBRIDGE, ALBERTA

November 20, 1970

Mr. B. G. Schuler,
Department of Lands & Forests,
909 - 3rd Avenue North
Lethbridge, Alberta.

Dear Mr. Schuler:

RE: RIVER LEASES

Further to our discussion on November 2, 1970 relevant to the harvesting of aggregates from leases on the Oldman River, at which time you invited a submission from this Company, we are pleased to outline our position.

At this time we hold three Sand & Gravel Leases, No's 2088, 2089 & 2133 from the Government of Alberta and have submitted a lease application for a small portion of the River between our Leases No. 2088 and 2133 which is still pending.

During the calendar year 1970 it is estimated that a total of 65,000 cubic yards of material will be harvested by this Company out of its River Leases and used in the manufacture of masonry blocks and ready mix concrete & to supply road and fill materials in the Lethbridge area. In May 1970 permanent installation of a washplant on Company property adjacent to the River Leases was completed. It is our intention to use the River as a permanent source of sand and gravel to feed this facility.

continued..../2

Method of harvesting is by dragline which excavates a cut along the main River Channel for the distance set out in the relevant operating plan and approximately four feet deep. The manner in which this is done in the fast flowing areas of the River is designed to ensure that Spring Flooding will cause redepositing of clean sand and gravel in the excavated areas and at the same time minimize the deposition of silt. This method of harvesting, coupled with the judicious placement of a diversion jutting, have resulted in adequate replacement of sands and gravels over the years and bank erosion in leased areas has been greatly inhibited.

It is planned to continue this method of careful harvesting from the River with production expected to grow at an estimated five percent per annum. The operations of this Company are entirely dependant on processing and sales of clean sand & aggregates in the form of concrete, masonry blocks, sand & gravel. With revenues of over one million dollars this year, and with plans for growth and expansion, it is essential that we ensure a continuing supply of clean aggregate in close proximity to our plant.

At present, Lethbridge Concrete Products Ltd. employs 40 persons on a full time basis, and in addition, hires up to 15 locally owned gravel trucks as and when required on contract; thus this Company makes and will continue to make a substantial contribution to the economy and growth of Lethbridge.

continued......./3

In order to conserve our valuable gravel reserves we are prepared to work closely with the Government in planning for the harvesting of gravel on our River Leases.

Yours very truly,

LETHBRIDGE CONCRETE PRODUCTS LTD.

E. C. OATES,
Vice-President & General Manager

ECO/ev

W. R. MADILL
SECRETARY-TREASURER

SCHOOLS
S. W. HOOPER, B.Sc., M.A., Supt.
C. E. BURGE, M.Ed., Asst. Supt.

County of Lethbridge No. 26
214 - 13th Street South
Lethbridge, Alberta

October 28, 1970

Mr. B.G. Schuler,
District Supervisor,
Department of Lands and Forests,
Administration Building,
909 3rd Avenue North,
Lethbridge, Alberta.

Dear Mr. Schuler:

I wish to advise as follows with respect to our applications for gravel leases on riverbed areas.

1) S.E. of 3, Township 11, Range 19, W4M. Our normal requirements from this pit are in the area of 12 to 13 cubic yards of gravel per year, as it is the only source of gravel supply for about two-thirds of Division No.2 of the County of Lethbridge. Our maximum supply requirements from this pit could be up to 20 thousand cubic yards of gravel per year depending on whether or not we have hardsurface programs in that area.

2) S.W. of 18, Township 8, Range 21, W4M. Our normal gravel requirements from this location would be in the area of 10 to 12 thousand cubic yards per year. This pit services all of Division 1 of the County of Lethbridge, and if we were to have hardsurfacing programs underway in the district, our maximum requirements could go to 20 thousand cubic yards per year.

...../2

W. R. MADILL
SECRETARY-TREASURER

SCHOOLS
S. W. HOOPER, B.SC., M.A., SUPT.
C. E. BURGE, M.ED., ASST. SUPT.

County of Lethbridge No. 26

214 - 13TH STREET SOUTH

Lethbridge, Alberta

...../2 October 28, 1970

3) S.W. of 30, Township 9, Range 21, W4M. Our normal requirements from this pit is in the area of 6 to 8 thousand cubic yards of gravel per year. This pit services all of the W½ of Division No. 3 of the County of Lethbridge.

4) We recently made an application for gravel licence on riverbed on the E½ of Section 11, Township 8, Range 22, W4M, and our purpose in doing this would be for supplies of gravel when no replacement gravel comes to the bar in the S.W. of 18-8-21-4. This condition sometimes prevails when the river flow is lower than normal.

We would be pleased to have you give favorable consideration to our applications at the above noted locations.

Thank you.

Yours truly,
COUNTY OF LETHBRIDGE NO.26

W.R. Madill,
Secretary Treasurer

M/m

MY INTERPRETATION OF MR. R.J. KNIGHT'S OPINION,

DISTRICT B.R.D. ENGINEER

Mr. Knight was contacted and we went over Book #2 of this report, plus the photogrpahs and some of the data in Book #1 of this report.

Mr. Knight is well aware of the situation whereby irrigation spill-water is being dumped over the river banks without suitable drop structures.

Mr. Knight informed me that a study had been done on the river by a Water Resources Engineer who estimated that about 100,000 yards of aggregate is being replaced naturally by the river every year?. This is due to natural erosion from the watershed. The whole river bed to bedrock moves during peak annual flows.

Mr. Knight indicated that he felt that the degree of pollution or affect on the river caused by gravel removal is very minimal and in most cases is insignificant.

Mr. Knight has recently looked in to the possibility of stream sedimentaiton caused by gravel washing. Mr. Knight found out that no one is allowing their wash water to escape directly into the river and thus are not polluting the river in any way from gravel washing.

MY INTERPRETATION OF MR. GLEN TOLLESTRUP'S OPINION OF NEW LETHBRIDGE SAND AND GRAVEL

This company utilizes on the average about 200,000 yards of aggregate per year. During the summer months this company employs about 75 men in the Lethbridge area plus about 75 men in the areas away from Lethbridge. The winter employment of this company is usually at about half of their summer numbers.

Mr. Tollestrup indicated that use of material from the river in this area is important and vital to their operations to remain on a competitive basis and to hold prices at a reasonable level.

Mr. Tollestrup indicated that he will not likely remove any more gravel from Lease #2055 or the Crawford Lease on the adjoining river flat.

RECOMMENDATIONS FOR FUTURE USE OF AREA

I will first summarize my findings and conclusions I have come to and make recommendations.

I might quote from a writing by Dr. William G. Corns, Chairman of Pland Science Department, University of Alberta -

> "The primary objective regarding all sources of water pollution should be prevention. Decisions and action should be bases on sound research information and applied not only to recreational waters but also to other classes, especially those for domestic use, livestock, and irrigation."

It would be an ideal situation if we had enough sound research information on which to base our decisions but actually we do not: which is the case in most decisions we make. If a person thinks about this, one can readily see that this is the situation. We normally have some information to assist us in a decision but not enough to know or be sure the decision is the correct one. If the decision I come to in this report proves to be incorrect as the years progress, action will have to be changed but at least I have attempted to come to the correct decision with the limited information I have.

I will now list some of the things I don't know and if I had information on this nature I would get close to following Dr. Corn's writing which I quoted for stream gravel removal.

(1) How much sediment does gravel removal add to the stream during gravel removal?

(2) How much gravel in this area is replentished each year by natural erosion?

(3) How far does the gravel and sand of different sizes move during peak annual flows?

(4) What is the best method of removal of gravel from a stream, where to remove it from and when?

(5) Should there be any gravel removal from rivers?

The present facts are that we do have existing sand and gravel leases on which the lessees have rights to operate. The Department of Highways is one of the largest users of river sand and gravel. It would not be very politically expedient to attempt to stop other users of sand and gravel until we discontinue this use by the government. I doubt if the Department of Highways considers adjoining land use when they remove gravel to build a highway. I believe their primary concern is to build the best possible highway at the least possible cost. The basic problem is that most of our society is too dollar-oriented and are for the whole not conservation minded. Some people go to the extreme of being "preservationists" which is often not good conservation. To clarify - "preservationists" are people who try to propound that NO use of any kind is the only answer - which is a ridiculous attitude as we could not exist if we did not make use of our natural resources. Quite often non-use of a resource can result in its reverting to a very unhealthy state: eg. game in the Federal Parks whose numbers are not reduced and are atificially protected are normally stagnant (not increasing in numbers) due to disease because the pooorer species are not eliminated.

Methods of operation in the River bed should be controlled and a good operating plan is vital in order to accomplish this. In my opinion operating in reasonably fast flowing water at least 25 feet

into the stream away from the waters'edge is advantageous to avoid channel change. The gravel should be taken out into a unifrom depth preferably using a machine such as a caterpillar and a bucket or a similiar machine on rubber. In no instances should deep holes be made in the river bed as this causes eddying of the water which results in erosion and siltation of a site. Note photograph #7 on page 31 of this report. It shows that holes were dug. None of the gravel operators I talked to disagreed with this technique. Advantages of this system should be:

(1) Removal of clean material.

(2) Minimum stream change.

(3) Minimum resultant stream siltation.

(4) The gravel will be redeposited in the channel and can be removed annually.

It is my feeling from observations I have made that it is not necessary to issue a large number of sand and gravel lesases in the bed of the river to one operator. I feel that two properly placed leases in one district for any one company is normally enough. Areas of the river should not have any leases at all on them to protect the leases which are issued. If properly operated a removal area should naturally fill in every year.

Sites I would select for the two private companies involved are:

(1) New Lethbridge Sand and Gravel (a) Lease #2092
(b) Lease #2093
(b) plus upstream from the city water intake. This would be supervised in conjunction with the city engineers.

(2) Lethbridge Concrete Products (a) Lease #2088
(b) Lease #2089
(b) plus the new area applied

The remainder of the sites now under lease to the above two operators should not be renewed and no leases to anyone should be issued. In other words, I recommend zoning the river to show where sand and gravel leases may be considered.

It is my opinion that no small "fly-by-night" operators should be issued leases or liscenses in any river bed as damage they could do could be very serious. To get remedial action may be almost impossible.

It would appear that irrigation spill-water is contributing a considerable amount of silt to the Oldman River. As water resources is no doubt aware of the situation, I do not feel it is necessary to elaborate. I am not trying to justify poor land use for the sand and gravel operators due to poor use by others. I feel I am justified, however, in pointing out other problem areas which should be corrected to eliminate pollution of the river. A larger minimum flow of water will greatly improve the situation.

Valley Feeders within the city limits and next to the river also is a bad incompatible land use and adds to river pollution. This is one of the largest livestock feedlots in Alberta.

The government should pass enough authority to our department to ensure that good restoration is effected by the municipal or local governments. It has been my experience that local governments are the worst offenders in so far as lack of restoration of gravel removal areas is concerned. I have reported several bad leases which have been used by municipalities and counties - to my knowledge not a single site has been restored by those who made the mess even though they received letters requesting cleanup from the Supervisor of Special Land Use - Mr. John Markovich. Legislation with teeth in

this area is required. The Department of Highways and private companies are better at restoring mining sites than are local governments who get the gravel for no royalty. Some local governments indicate that they intend to restor sites.- but words come easy and action is slow.

Refering back to method of operation - this should be clearly and quite precisely indicated. This plan can be made out solely by the applicant and if found suitable can be accepted. It could be altered or made in co-operation with the operator and field-men in the area.

It is quite interesting to note that Mannix, who took over Lethbridge Concrete Products have accepted my interpretation of the high water line which is resulting in a larger portion of the gravel they remove being credited as crown thus we are receiving much more royalty. Our department backed down in a similiar situation at E½ 36-8-22-W4.

The island in NW 13 and SW 24-9-22-W4 appears to be crown land according to sketches prepared from the survey plans. The Technical Division should check into this and advise me as Mr. Davis presently claims ownership. Mr. Davis has sold a considerable amount of gravel offf this island.

I agree that the degree sand and gravel operations should disturb ~~is~~ adjoining upland is an absolute minimum. Usually the operators own the adjoining upland and thus we have no control. Where we have control, Mr. Barrett's comments will certainly be kept in mind and we will encourage the operators to disturb upland in the river valleys as little as possible.

SHORT SUMMARY

(1) The river should be zoned to show areas in which gravel removal will be considered.

(2) Gravel leases in stream beds should only be considered when they are to larger established, responsible companies.

(3) Amount of material removed should not be more than is naturally replaced by erosion. Studies should be done to determine how much may be removed.

(4) Restoration of removal sites should be more strictly enforced than at present for all who use the material. Failure to restore should result in consideration being given to no more lease being issued to the remover involved.

(5) Siltation of the stream should be kept at an absolute minimum by proper removal technique. Siltation of the stream from gravel removal should be determined.

(6) Indications are that irrigation spill-water adds greatly to the sediment load of the river in this area. This should be looked into and corrected.

(7) A strong position should be taken on control with severe penalties for violations such as illegal gravel removal from streams. Damage resulting could be irreparable due to improper operation.

(8) The ownership of the island in NW 13 and SW 24-9-22-W4 should be checked. I believe it is crown land.

(9) Maintaining a minimum flow of 500 c.f.s. in this stream would be beneficial to the river and reduce pollution levels.

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BOOK TWO

MAPS AND SKETCHES OF STUDY AREA

Elaboration about these maps and explanations will be made in Book One of this report.

These books are designed to be used in conjunction.

Page 2 - Map of Lethbridge Region and Location of Study Area

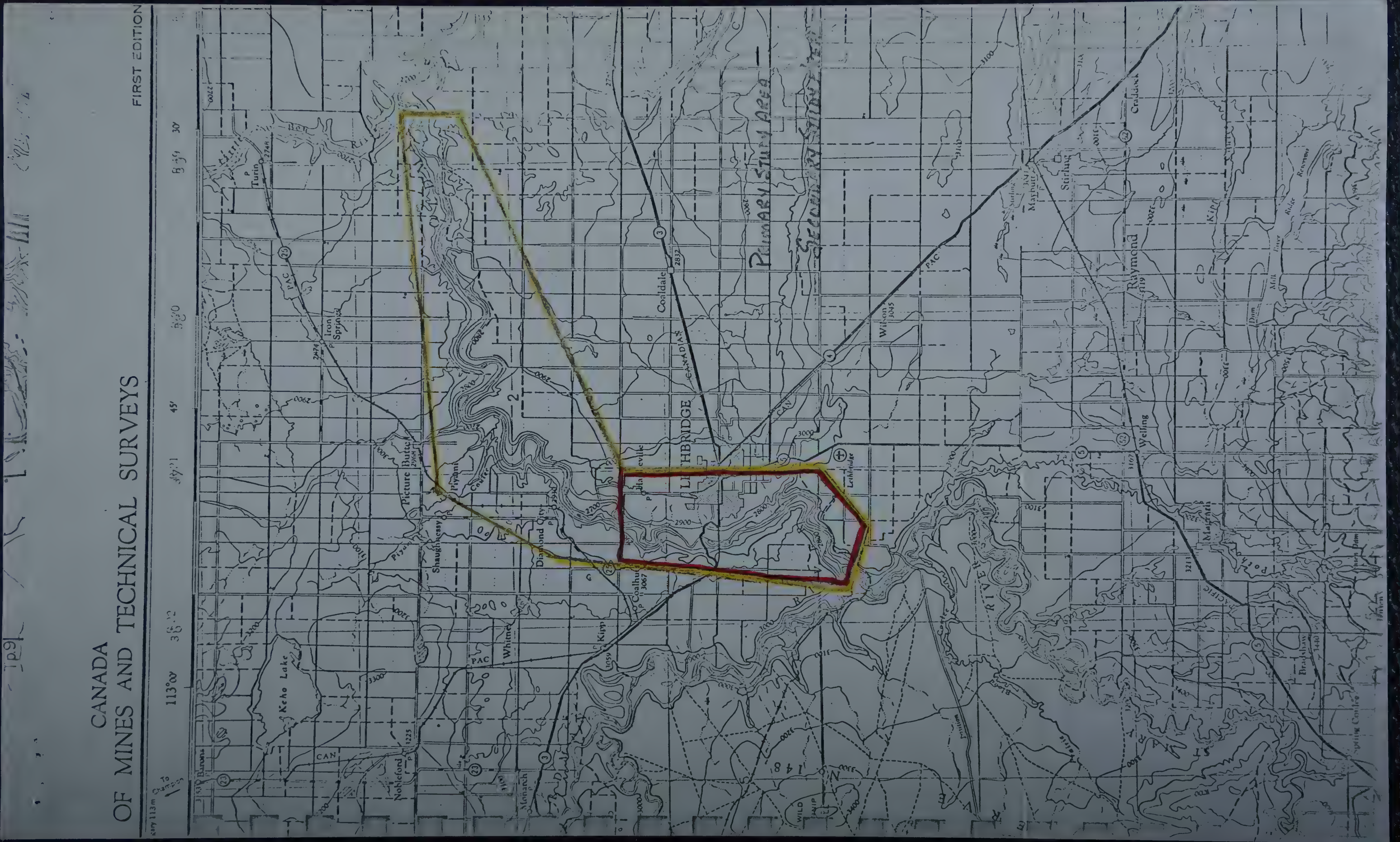
Pages 3 & 4 - 1961 Base Map Showing Sand and Gravel Lease Locations and Other Features

Pages 5 & 6 - 1961 Base Map With 1916 Overlay Showing River Course Change

Pages 7 & 8 - 1961 Base Map With 1950 Overlay Showing Location of River and Course Change

Pages 9 & 10 - 1961 Base Map With 1970 Overlay Showing River Course Change

Pages 11 & 12 - Location of Coal Mines in Lethbridge Region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OF MINES AND TECHNICAL SURVEYS
FIRST EDITION
PRIMARY STUDY AREA
SECONDARY STUDY AREA
LETHBRIDGE
Coaldale
Picture Butte
Iron Springs
Turin
Shaughnessy
Diamond City
Coalhurst
Kipp
Whitney
Nobleford
Monarch
Keho Lake
Wilson
Raymond
Stirling
Magrath
Welling
Bradshaw
Spring Coulee
Craddock
Broxburn
Pyramid
Coffee
Little Bow River
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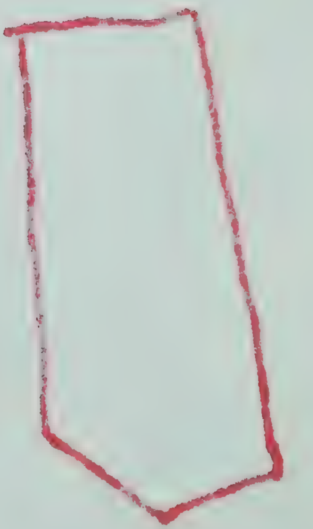

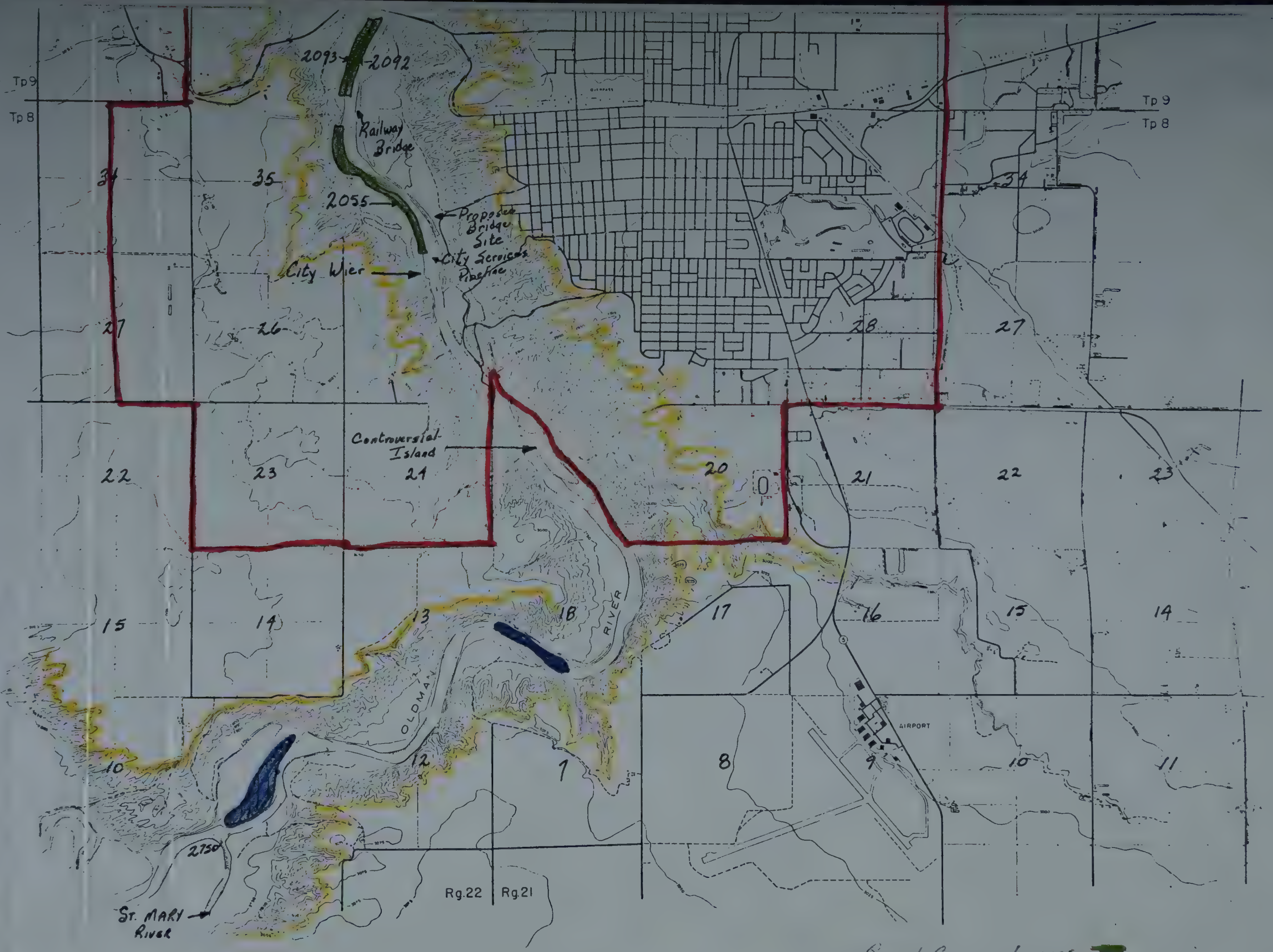

CITY OF LETHBRIDGE

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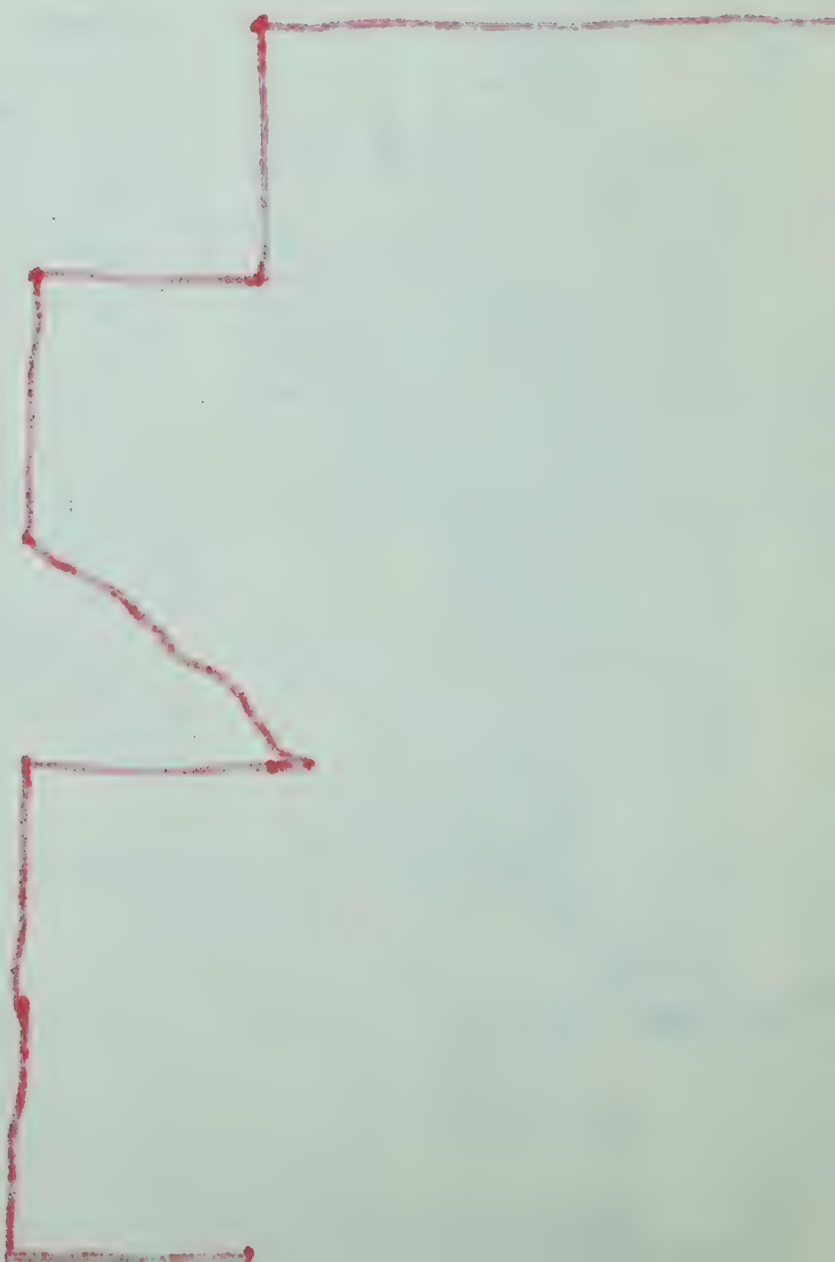

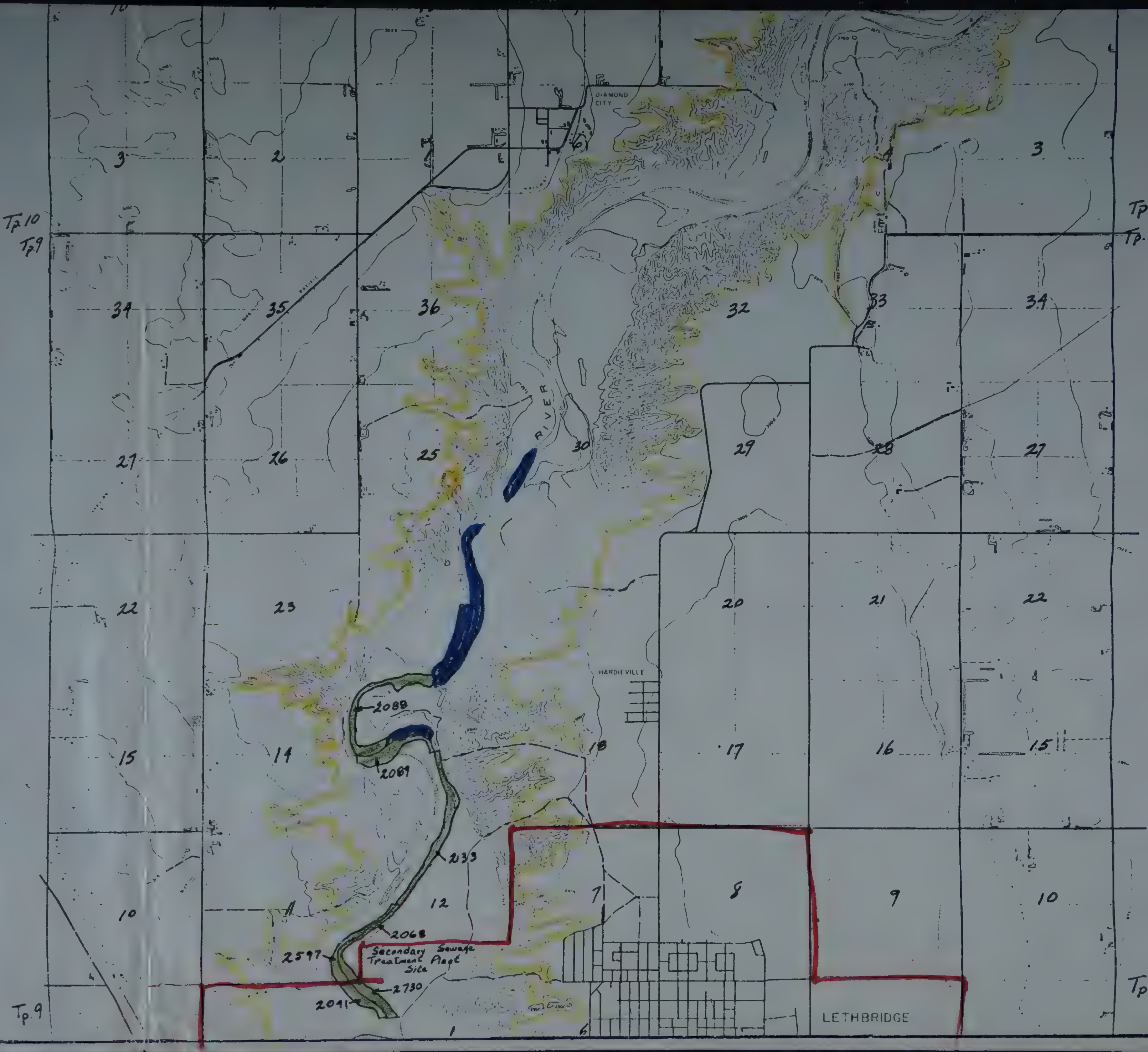

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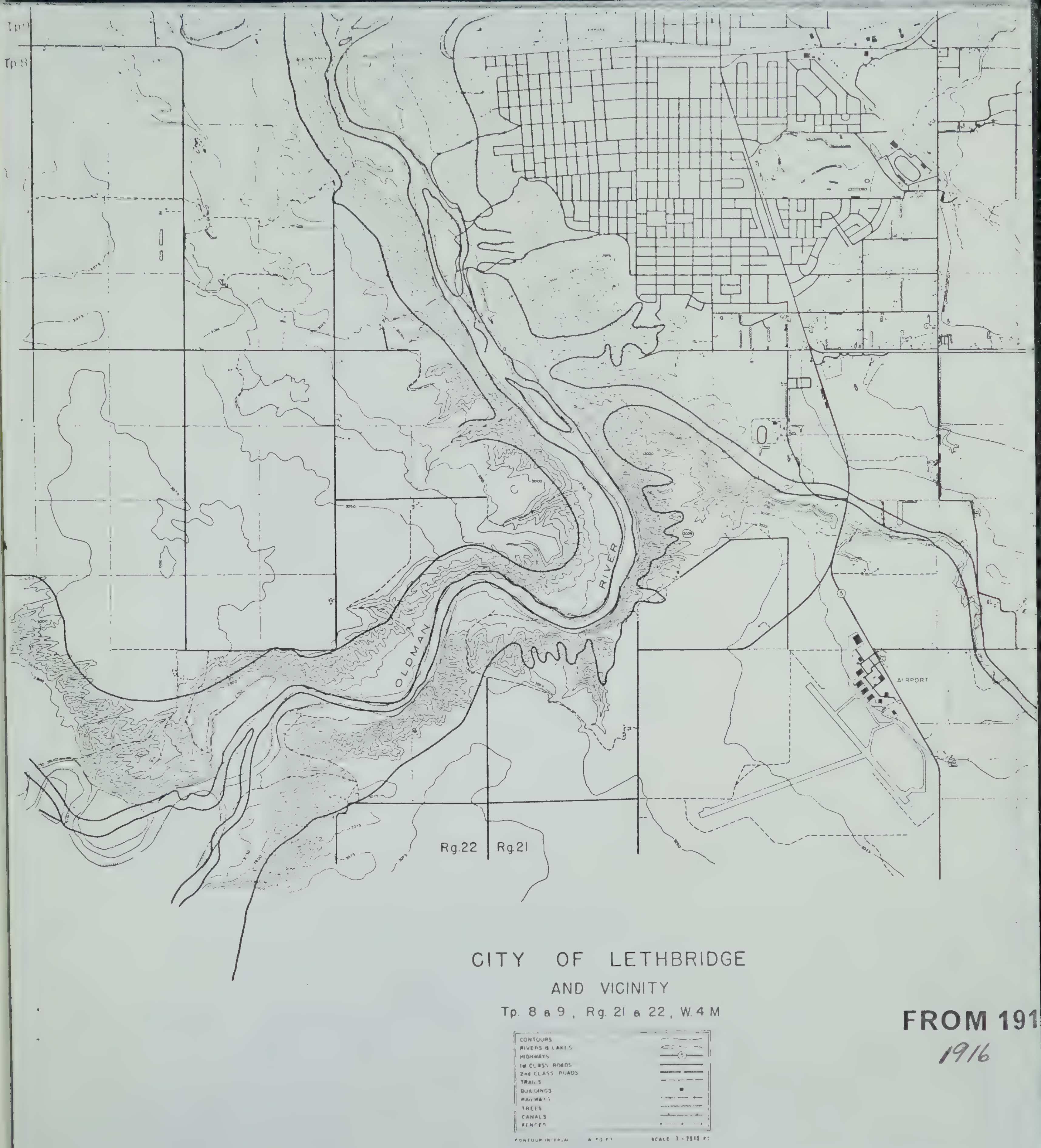

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AND VICINITY

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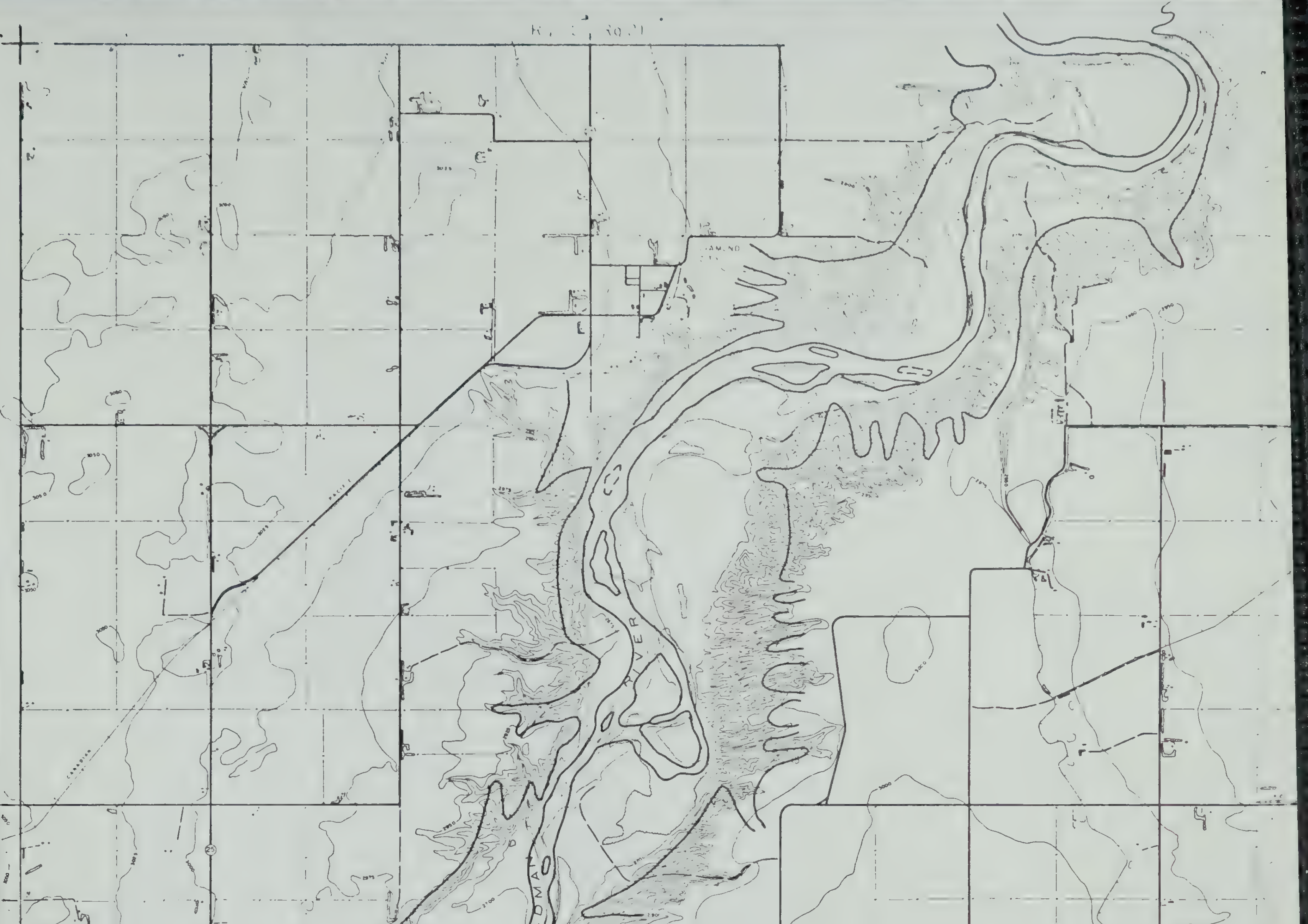
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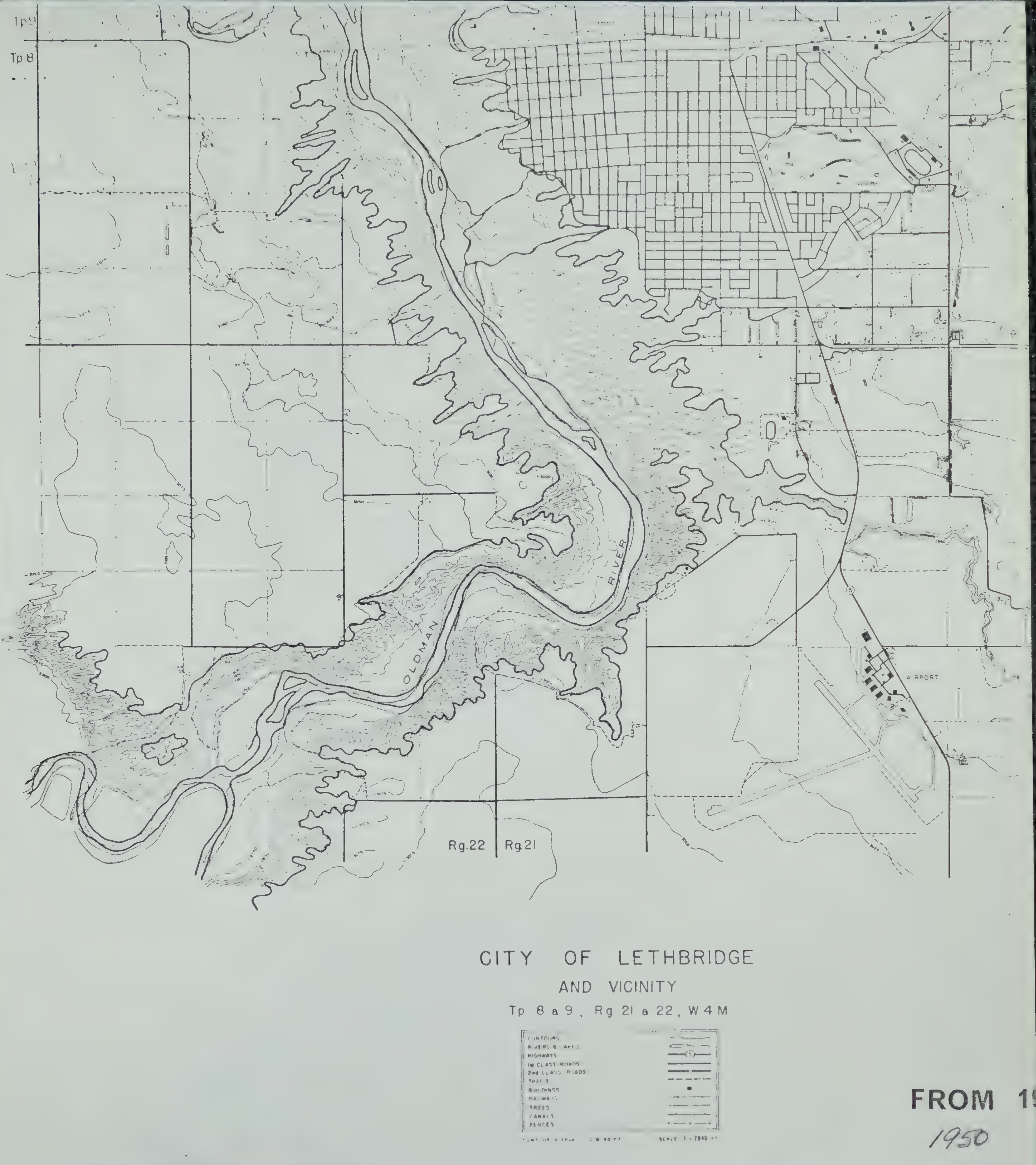
HARDIEVILLE
LETHBRIDGE



CITY OF LETHBRIDGE

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Tp 8 a 9, Rg 21 a 22, W 4 M

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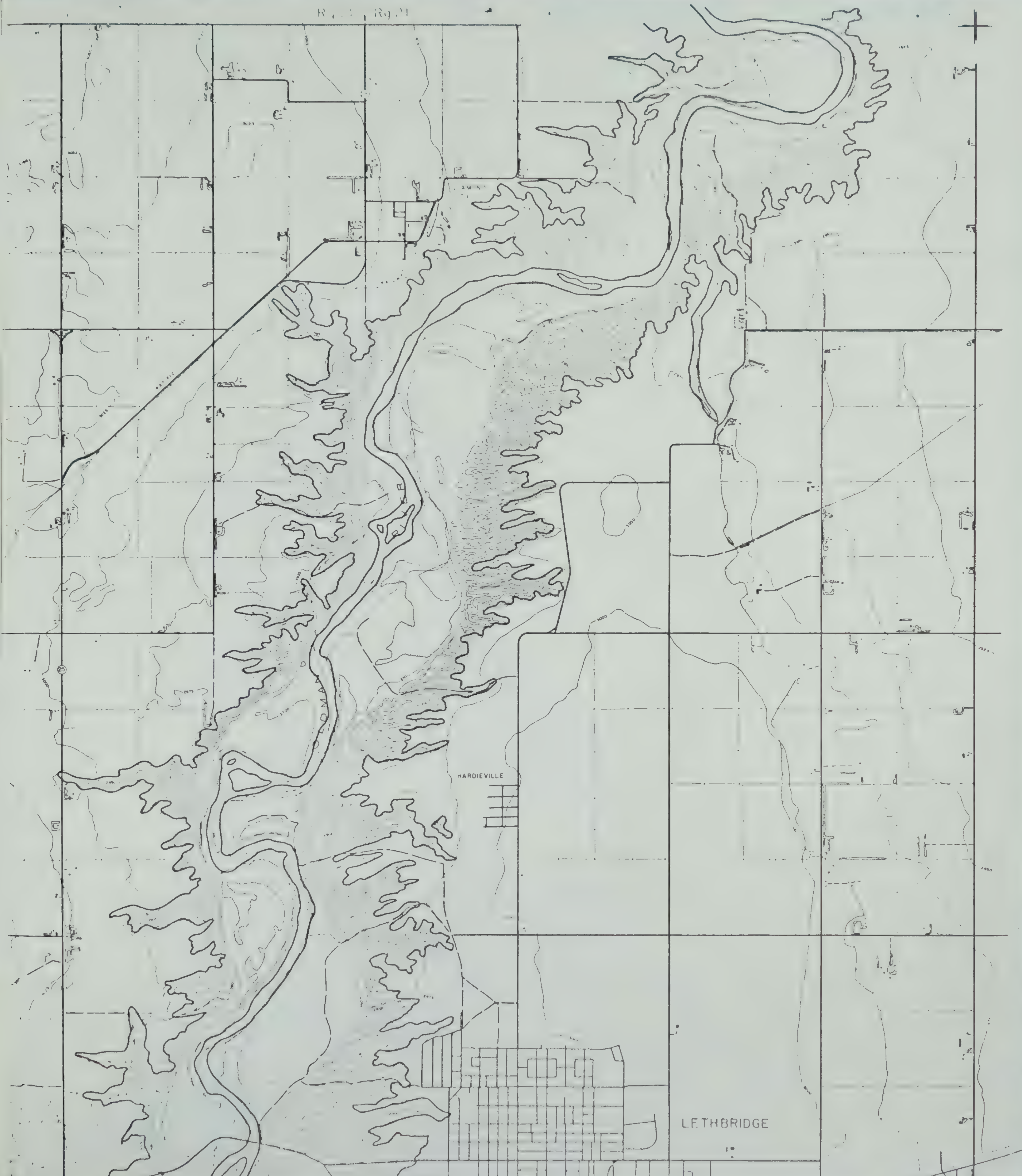
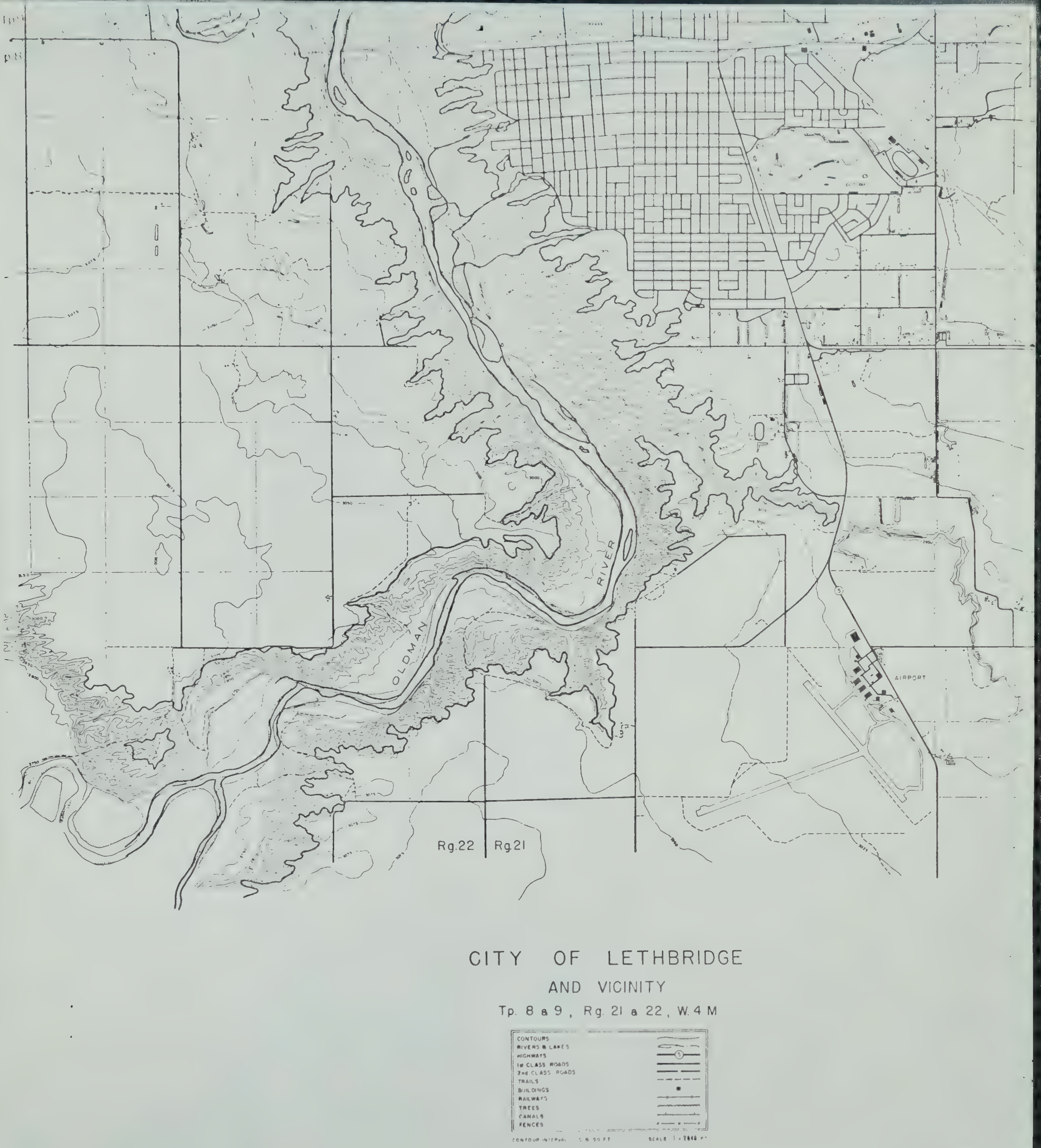
1950


Rg.21
OLDMAN
HARDIEVILLE
LETHBRIDGE



CITY OF LETHBRIDGE

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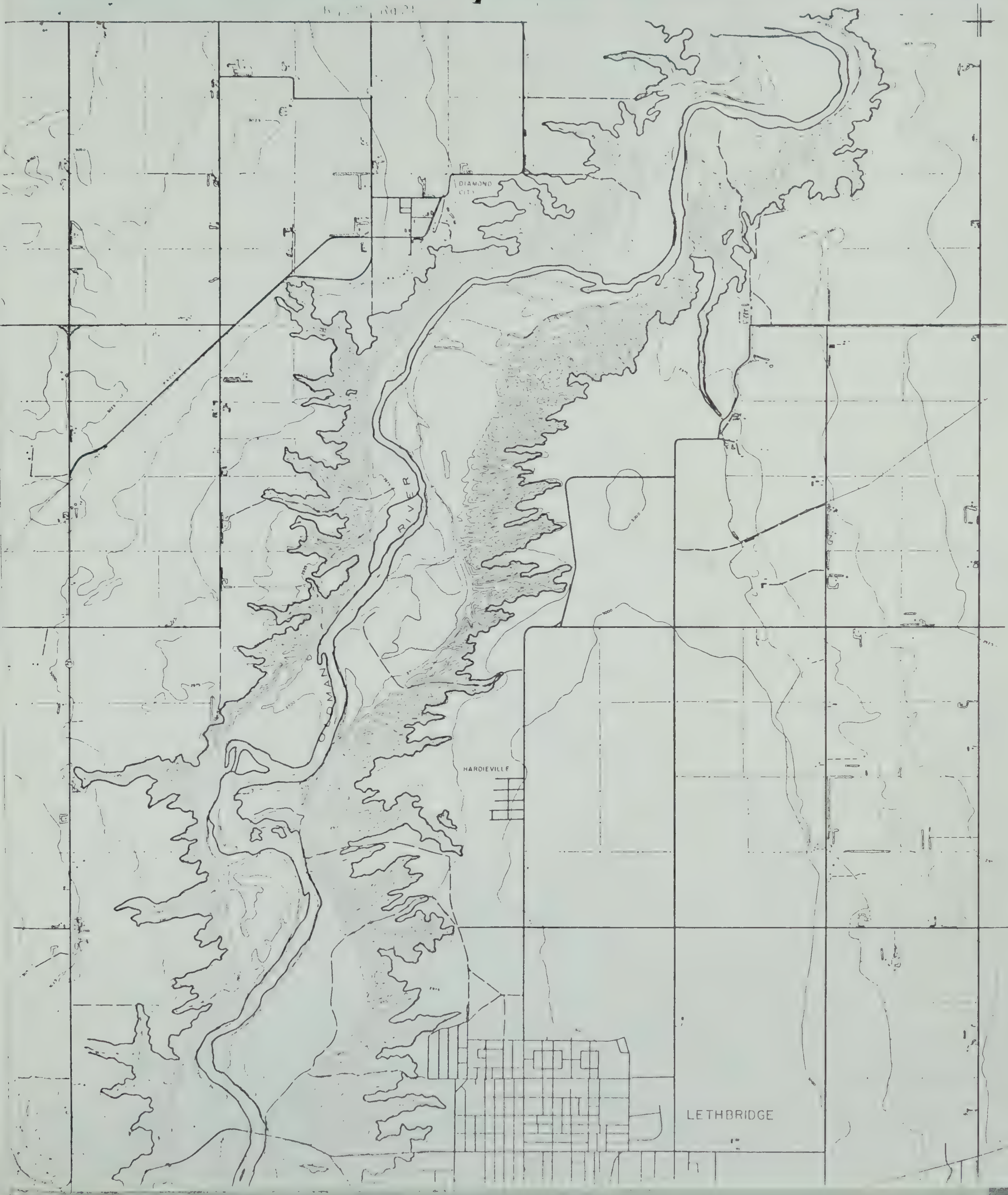
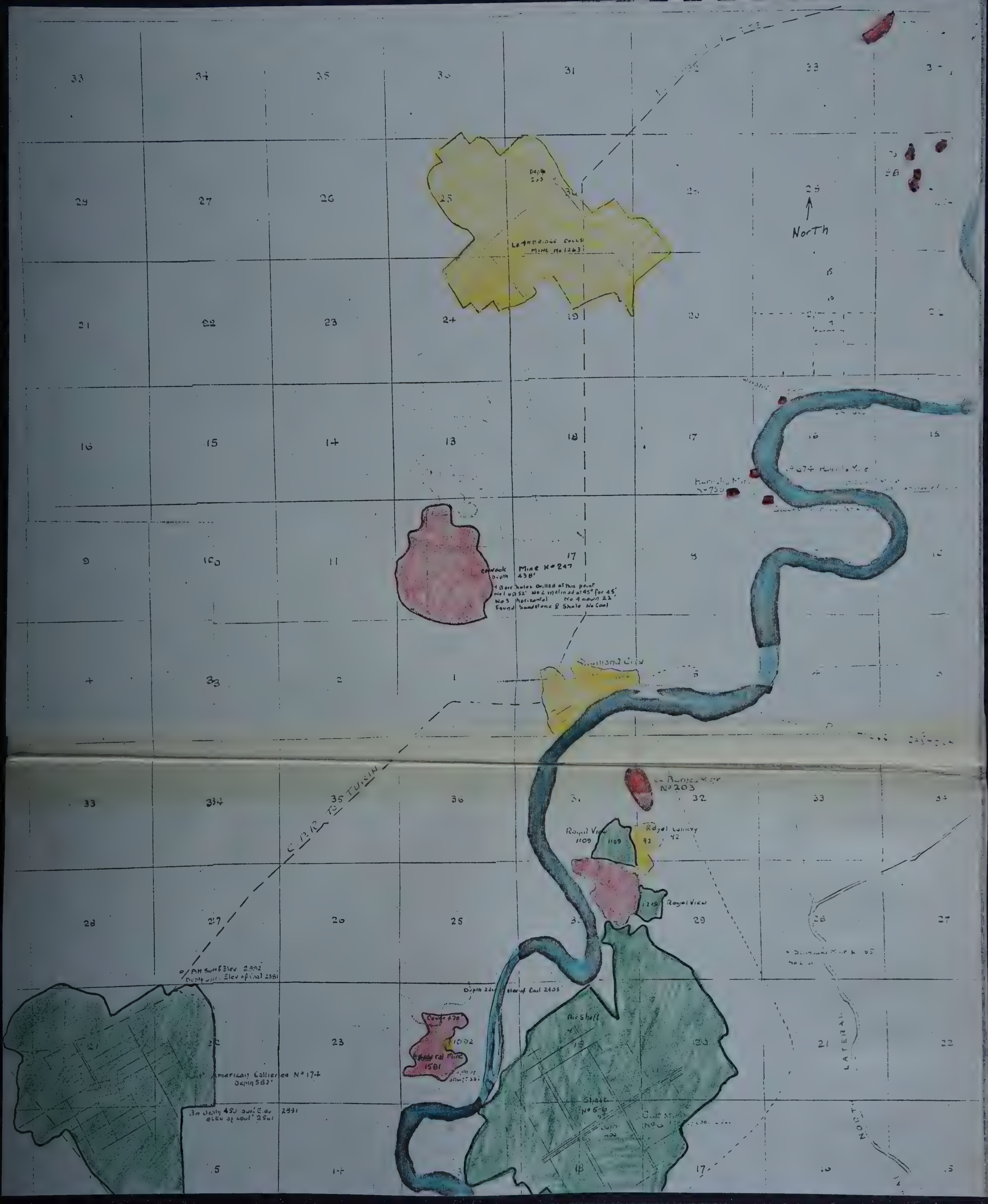
1970


DIAMOND CITY
OLDMAN
RIVER
HARDIEVILLE
LETHBRIDGE


North
Lethbridge Colls Mine No 1263
Depth 2?3
Chinook Mine No 247
Depth 438'
4 Bore holes drilled at this point
No 1 up 52' No 2 inclined at 45° for 45'
No 3 horizontal No 4 down 22'
Found Sandstone & Shale No Coal
Diamond City
Hardieville Mine No 75?
No 74
Burnes Mine No 203
Royal View 1109
1109
Royal Colliery 42
92
1219 Royal View
Depth 22? Elev of Coal 2405'
Coaldale 670
1092
Federal Mine 1581
Air Shaft
Shaft No 6-6
Galt Mine No 6
Depth 400
American Collieries No 174
Depth 582'
Surf Elev 2992
Depth Elev of Coal 2381
Depth 450 Surf Elev 2991
Elev of Coal 2561
C.P.R. To Turin
Lateral
North
Diamond Mine No 65
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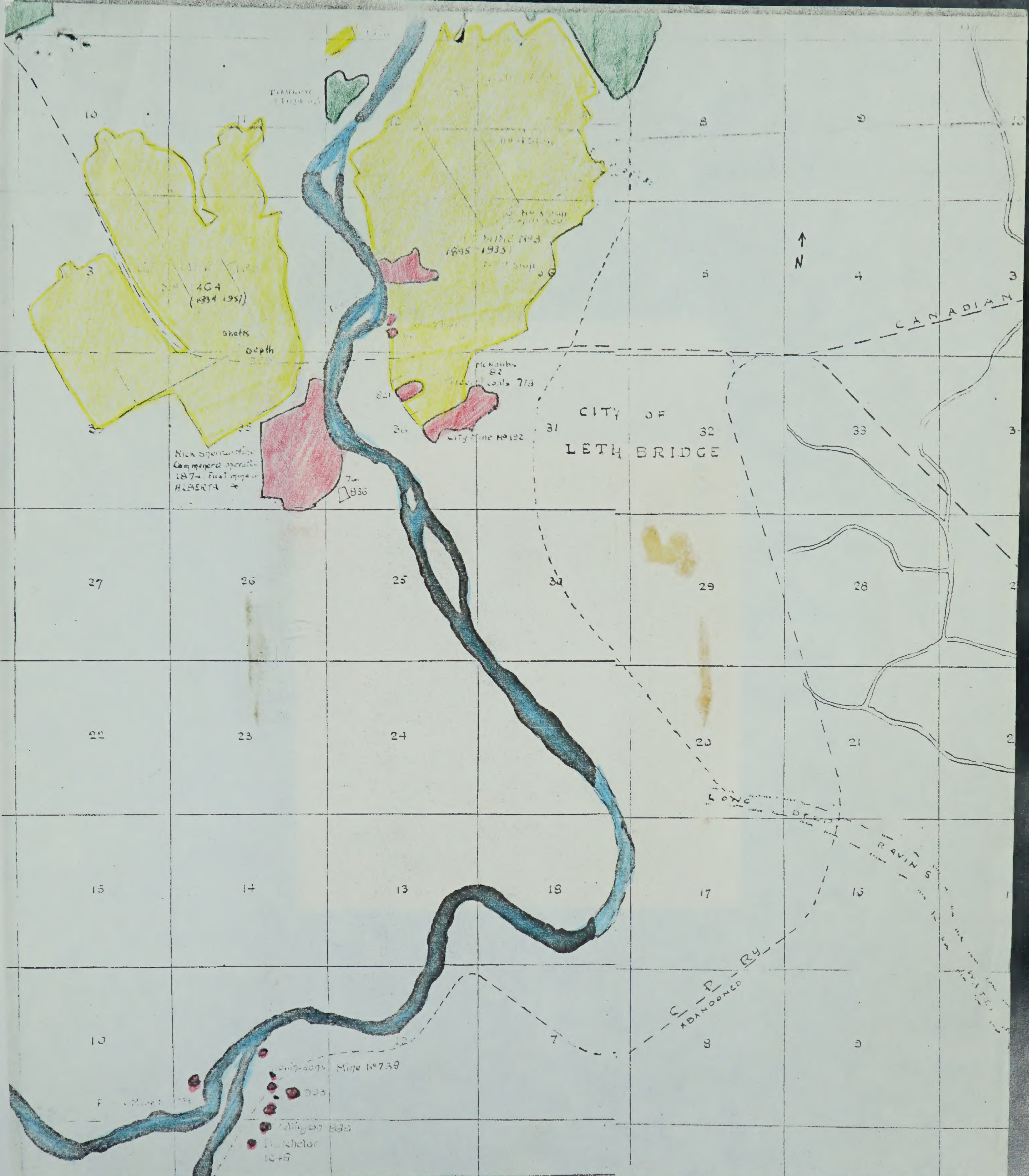
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CITY OF
LETHBRIDGE
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Nick Sheran Mine
Commenced operation
1874. First mine in
ALBERTA
836
City Mine No 192
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LONG DEEP
RAVINS
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C P RY
ABANDONED
Mine No 739
Batchelor
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